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HE WOODY PLANTS OF KENTUCKY

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THE WOODY PLANTS OF KENTUCKY.

By H. GARMAN,

Entomologist and Botanist of the Station.

The following list is to be regarded as preliminary to a more complete account of the woody plants of Kentucky. The material for it has been accumulated during a good many years of collecting and observation, both as State Inspector of Nurseries and as Entomologist and Botanist of the Kentucky Experiment Station, tho most of the time spent on native shrubs and trees has been incidental to the other work. It is believed that the list is nearly complete, notwithstanding, but some species are included more to get further information about them as Kentucky plants than because of a belief that they occur here. An example is the long-leaved or Georgia pine, said by Lafayette DeFriese to have been observed by him near Pound Gap. This pine is the common species in the sandy regions of the South Atlantic coast, and it seems very unlikely that it ever extended northward to our limits. But DeFriese wrote many years ago, at a time when our forests were much more extensive than now, and may be supposed to have had an opportunity to observe species here that have since been exterminated by farming and lumbering operations.

Several earlier lists of Kentucky plants have been prepared at different times. One of the earliest, perhaps the first, was written by "Henrico M'Murtrie, M. D.," under the title "Florula Louisvillensis" and was published in Louisville in 1819, coming from the press of "S. Penn, Jun. Main Street." It was printed with other observations made by the author, the whole being described by him as,

> "Sketches of Louisville and its Environs, including, among a great variety of miscellaneous matter, a Florula Louisvillensis; or, a catalogue of nearly 400 Genera and 600 Species of Plants that grow in the Vicinity of the Town, Exhibiting their Generic, Specific and Vulgar English Names."

The list contains the names of both cultivated and wild plants, so that it is sometimes impossible to say whether or not a plant recorded was actually observed growing wild about Louisville. Excluding those evidently introduced, such as the peach, pear and apple, the author appears to have observed 124 woody plants; tho when one finds in the list such species as *Azalea nudiflora, A. viscosa, Castanea pumila, Calycanthus floridus, Kalmia angustifolia* and *K. latifolia,* he is led to wonder as to the extent of the area considered by the author as in the "vicinity of the town," for these species are now pretty closely restricted to the mountains east and southeast of Lexington. The following Kentucky trees and shrubs are recorded in his list:

Amorpha fruticosa, sugar maple, red maple, soft maple (Acer pennsylvania, according to M.), box elder, Aralia spinosa, papaw, common buckeye, smooth-hulled buckeye (Aesculus lutea, according to M.), red bud, black birch, catalpa, trumpet creeper, hackberry, chestnut, chinquepin chestnut, hornbeam (Carpinus), hazel nut, flowering dogwood, Canadian dogwood (Cornus canadensis), upright dogwood (C. stricta), red-osier dogwood (C. sericea), button bush, hawthorn (C. crus-galli, C. coccinea, C. oxyacantha), Calycanthus floridus, persimmon, leatherwood, Epigaea repens, Euonymus carolinensis, E. sempervirens, beech, white ash, blue ash, swamp ash, honey locust, Hydrangea arborescens, witch hazel, American holly, black walnut, butternut, shell-bark hickory, shag-bark hickory, pignut, pecan, red cedar, narrow-leaved laurel, broad-leaved laurel, sweet gum, sassafras, spice wood, tulip poplar, Mitchella repens, mulberry, cucumber tree (Magnolia acuminata), Nyssa aquatica, N. sylvatica, cottonwood, shrub trefoil (Ptelea trifoliata), crab-apple, hemlock, wild cherry, sycamore, black elder, bur oak, white oak, chestnut oak (yellow oak), chestnut oak, willow oak, black oak, Spanish oak, red oak, gooseberry, black currant, great-leaved laurel, Rhus glabra, R. typhinum, R. radicans, R. copallinum, R. suavolens, Rosa caroliniana, R. parviflora, R. lucida, R. palustris, R. rubifolia, wild black raspberry, dewberry, blackberry, black locust, bladder nut, Smilax caduca, S. hastata, black elderberry, red elderberry, Salix nigra, S. sericea, trumpet flower, linden, white elm, red elm, Viburnum acerifolium, V. prunifolium, V. dentatum, V. lentago, Vitis vulpina, V. labrusca, V. aestivalis,

common creeper (Virginia?), whortleberry, huckleberry, cranberry.

In his life of Rafinesque, the author, R. E. Call, intimates that M'Murtrie secured this list from Rafinesque who was at the time actively engaged in studying the botany of Kentucky. If this is true it explains in a manner the mountain plants included. Rafinesque knew the flora of much of the State, whereas M'Murtrie aimed to present the flora of the region about Louisville. It seems hardly credible that the great laurel, red elder, mountain laurel and other species noted in the list have ever been found growing wild at Louisville.

The French-German, Rafinesque, was a remarkable man in his prime, of great mental and physical energy. He left a more enduring mark on the botany of Kentucky than any other pioneer writer. Some of his published species have never been collected by others in the State. He was an indefatigable collector at a time when the botany of the State was almost untouched either by the lumberman, the agiculturist, or the botanist, and thus had opportunities for study in the field not enjoyed by those who followed him. It is unfortunate that he was unable somewhere to leave a complete record of the work he did while here. He was made professor of natural sciences at the old Transylvania University in 1818, and for some years thereafter remained in Kentucky.

In 1833, Doctors Short and Peter, of Lexington, published their list of Kentucky plants in the Transylvania Journal of Medicine. In it are about one hundred and fifty-three species of woody plants, some of them probably observed in cultivation. The list covers the whole State, yet records only about thirty species more than M'Murtrie's Louisville list. This is the most satisfactory of the old lists, and bears evidence of having had the painstaking care which local lists should receive. Both men were good botanists, and appear to have scrutinized the plants of Bluegrass Kentucky with special thoroness.*

*It was my good fortune to know for a brief time Dr. Robert Peter, one of the authors of the list. He was well along in years, a good gray man, whose modesty, unselfishness and industry were most pleasant to witness. But in a selfish world these qualities too often work to the disadvantage of their possessors, and Dr. Peter has not yet, I think, received from Kentucky the appreciation his patient labor in her interest has earned for him.

Members of the old Geological Survey Staff, who published observations on Kentucky woody plants in the reports of 1880-1884, are, Professor A. R. Crandall, and Messrs. John Hussey, Lafayette DeFriese and W. M. Linney. Professor Crandall examined the forest trees of Carter, Boyd and Lawrence counties; Hussey, those of Barren and Edmonson counties. DeFriese seems to have traveled from the vicinity of Columbus on the west to Pound Gap near our east boundary; while Linney gives a good account of the trees and shrubs of Boyle and Mercer counties.

It is a pleasure to bear witness in this relation to the devotion to the study of our native plants by a Kentucky woman also, the late Miss Sadie F. Price, of Bowling Green. Her death from typhoid fever was, I suppose, a result of enthusiasm for botany, being probably contracted on some one of her collecting trips in the region about Bowling Green. Her work was but just begun when the end came.

The immediate incentive to the publication of the present list comes from the project recently set on foot by Attorney General Garnett, of establishing a planting on the Capitol Grounds at Frankfort, to which each county shall contribute a tree of its own selection. It was proposed in the Fayette Committee, consisting of H. F. Hillenmeyer, J. W. Porter and the author of this list, that if agreed to by the Governor and Judge Garnett the plan be extended to provide for a complete representation of the woody plants of Kentucky, thus constituting an arboretum covering some of the ground of the one Rafinesque planned years ago when connected with Transylvania University. The interest in the matter shown by Governor James B. McCreary and the members of his official family promised to make the enterprise a success this time, and a preliminary list of our commoner trees and shrubs was submitted by me in which characteristic species were assigned to each county in the State.

The list here presented completes this list, tho it has been in my hands practically as now printed for more than ten years. The arrangement followed is that of Gray's Manual, Seventh Edition. A question mark precedes the names of species as to whose occurrence in Kentucky I have some doubt. Introduced trees are not included.

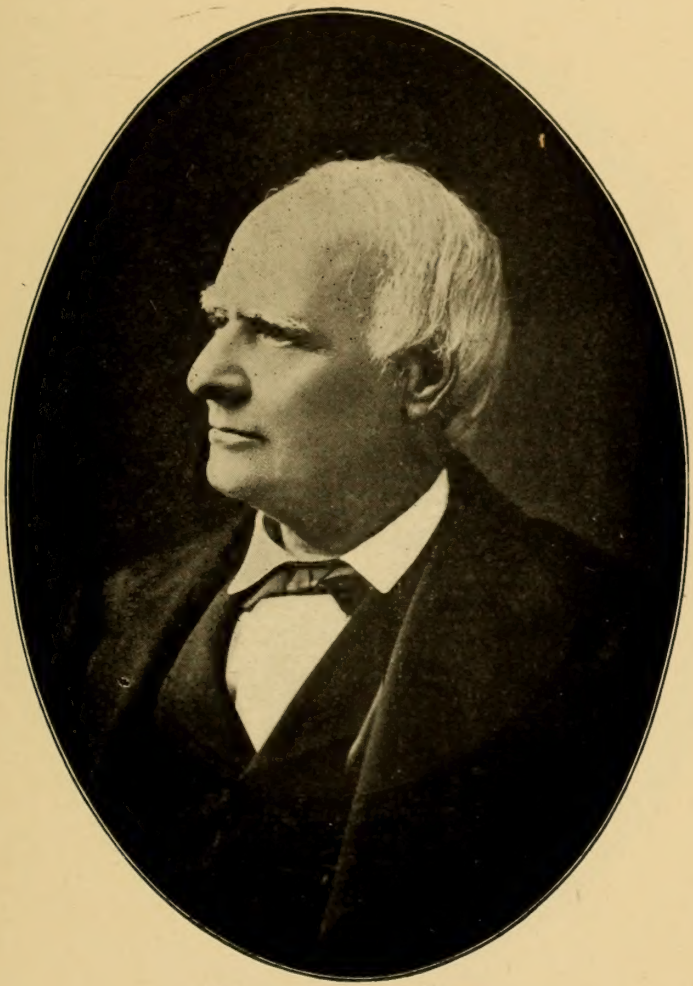


FIG. 1.—DR. ROBERT PETER.

B. O. Dodge

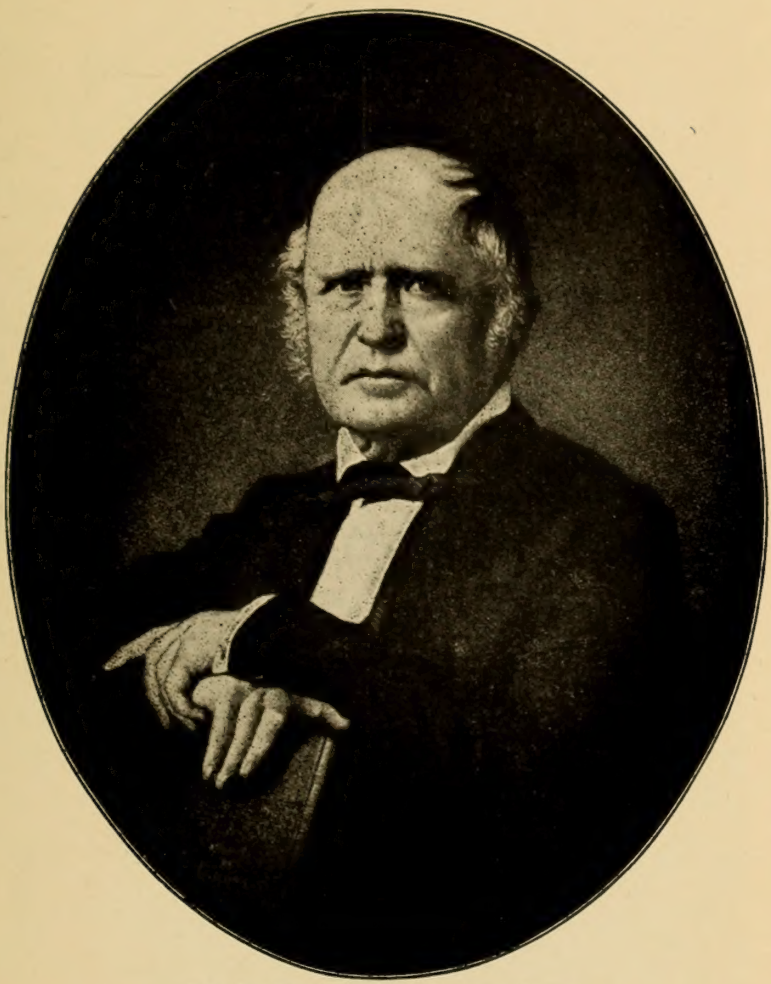


FIG. 2.—DR. CHARLES WILKINS SHORT.

FIG. 3.—SHOWING YOUNG FOREST GROWTH REMAINING ALONG KENTUCKY RIVER. Photographed by H. GARMAN.

FIG. 4.—AN EXAMPLE OF WOODY GROWTH REMAINING ALONG ONE OF OUR LITTLE-USED PIKES. VIRGINIA CREEPER ON TRUNK OF TREE. Photographed by H. GARMAN.

The records of localities must not be regarded as complete. In this connection I must thank correspondents who have furnished information as to the trees of their respective localities.

The woody plants of Kentucky are a very miscellaneous assemblage of species which appear to have been brought together by a diversity of influences. Probably the mountains in the eastern part of the State furnished most of them, having constituted a sort of reservoir which overflowed as the land to the westward became habitable. There is little in the present distribution of the species indicating that any large number of them came to the western part of Kentucky directly from the north or west, indeed, it looks as if the states immediately north of us had also received many of their forest trees originally from the Appalachian Mountains, the important route of migration having been along the Ohio River. Nearly all of our species of pines are still most abundant in the mountains, and but one (the scrub pine), has traveled very far to the westward within the State. The red cedar has extended more rapidly and farther than any of the true pines, but appears to have had a similar origin, and this seems to be true even of the swamp cypress. It still occurs locally along the Ohio River, tho now most numerous in the extensive swamps along the Mississippi southward.

This influence of the rivers on the distribution of our species finds a striking illustration in plants regarded as specially characteristic of mountainous country. Some of them grow far to the westward of the mountains, in Edmonson, Warren, Barren and to some extent other adjacent, more northern counties. The mountain laurel, *Magnolia tripetala, M. macrophylla*, hemlock, fringe tree, and some other less well known species occur along the Green River in these counties, having apparently migrated here from the headwaters of the river. Sheltered under its banks and bluffs from the cold north winds and shielded by the heavy growth of vegetation accompanying them, even magnolias have pushed out here as they have done nowhere else in Kentucky. We find no trace of them on the open elevated plateau known as the Bluegrass Region, and they seem never to have occurred here.

The intermediate position of the State results in the presence of a surprising variety of species. Side by side in the mountains

one finds the northern white pine and the tender southern magnolias. Added to these characteristically northern and southern plants is a host of individuals representing most of the trees and shrubs of the eastern United States. Taking the oaks as an example: Twenty of the twenty-two species of Eastern North America occur in Kentucky. The live oak of the Gulf States, and the yellow oak (*Quercus ellipsoidalis*) of the far North are the only oak species not found here. It is probable that every one of the ashes occurs in the State, tho the pumpkin ash (*Fraxinus profunda*) has not yet been collected on our side of the Mississippi River. Every one of the five East-American elms grows in Kentucky, the southern species (*Ulmus serotina*), coming just within our southern limits.

The great Kentucky forests present when the State was settled were, it is believed, not due so much to the diversity and richness of our soils as to this central position and our diversity of surface and climate. Some efforts have been made by early writers to find a relation between the flora of Kentucky and the geological formations exposed in the different parts of the State. The relation has never been clearly and satisfactorily defined and demonstrated, and is certainly not a dominating influence on the distribution of our species. The writer has for many years been accustomed to check the plants of the State, as he observed them, on small maps showing the formations, and after thus tabulating many of them, has been forced to the conclusion that the conditions influencing the distribution and assembling of our trees were largely of the general sort which were in operation before much of the surface of Kentucky was habitable; that moisture, temperature, means of dispersal, configuration of surface, etc., control their distribution more than soil influences. They will grow almost anywhere on any sort of soil, even on that consisting largely of rock, if only the winters are not too cold, the droughts not too severe. They make a better, more rapid growth with an abundance of plant food, but will strike root and make some growth where seemingly there is little or none. Some, like the swamp cypress, the swamp white oak, and pin oak, want a very wet soil and in nature are found quite closely restricted to such soils, yet they will grow when trans-

planted to rather dry situations. Others, like the sycamore, the river birch and the willows, follow the streams pretty closely, yet can accommodate themselves to other situations when transplanted. They depend largely, it seems, upon water for dissemination, and this is a sufficient explanation of their being most numerous along streams. In early spring when streams are at flood and bottom lands are covered one may see the seeds of sycamore dropping upon the water and floating away with the current.

Many of our native trees grow, or once grew, in nearly or quite all of the counties of the State. I have the "Barrens" in mind as a partial exception in writing this. It would tax one's ingenuity, I imagine, to find a vital relation between geological formations and the following widely distributed Kentucky species: Black walnut, sugar maple, soft maple, box elder, mulberry, black cherry, wild plum, white ash, black oak, white oak, shell-bark hickory, bitternut, red bud, black locust, honey locust, flowering dogwood, persimmon, black haw and trumpet creeper. If scattered by birds and small rodents, as in the case of the mulberry, walnut, cherries, red cedar and mistletoe, plants will be found widely and evenly scattered, for they spread both with and against wind and water currents. If disseminated by running waters they are unevenly scattered. If neither of these influences affect them and the seeds are heavy, the dispersal may be slow, and the species local in distribution. With the winds to help, as in the case of the maples, linden and others, the prevailing winds should mark out the path over which in the long course of time the species will travel. I have no doubt that all of these influences have been concerned in assembling the forest flora of Kentucky, but have operated so long that it is now difficult to estimate the part each has taken.

But one native tree, the chestnut, shows in any marked way the influence of *soil* on its distribution. In this State it will be found growing wild only, or almost entirely, in soils containing sand. It can be transplanted to the clay loams of Bluegrass Kentucky, but so far as I know never grew here spontaneously. Yet just outside this region it is a common tree where sandstone appears at the surface. How it has managed to follow so closely these outcroppings is an interesting question. Its dissemination seems

to be effected by squirrels and other animals, but why these animals should not in time have established the trees on new soils is difficult to explain, unless sandy soils exert some favorable influence, lacking in other soils, on the germination of the seeds. Some indications of a *prevalence* of other species on certain geological formations are to be detected, but when the distribution thruout the State and outside our limits is considered one is led to refer most of these cases to other influences than those coming from mineral constituents of the soils.

Yew Family (*Taxaceae*).

? Ground Hemlock, American Yew, (*Taxus canadensis*).—This bushy evergreen is given in M'Murtrie's list, but Short and Peter omit it. Dr. Gattinger, also, does not include the species in his "Tennessee Flora." In John Hussey's list of Barren and Edmonson County plants it reappears under the name "*Taxus baccata*, var. *canadensis*," but the author says nothing about it in his discussion of the evergreens observed by him. Gray gives the distribution as extending from Newfoundland to Virginia, and, at the north, westward to Iowa and Manitoba. The author of this list is familiar with the plant as it occurs in northern Michigan. He has botanized repeatedly in Barren and Edmonson counties and has never observed it there. It is doubtful if it can be considered a native of this State, but attention is called to it in the hope of getting further information. The leaves are green on both sides, in which respect it differs from young growth of the common hemlock. Its fruit is a red berry instead of a cone.

Pine Family (*Pinaceae*).

White Pine (*Pinus strobus*).—A beautiful evergreen, producing a splendid, white, soft, easily-worked wood. Some very good trees, two feet in diameter of trunk and sixty feet or more high, were noted seventeen years ago at Torrent in Wolfe County. Young trees are still not uncommon. The tree is well adapted to parks and lawns.

Bath, Boyd, Casey, Clinton, Crittenden, Estill, Fleming, Floyd, Lewis, Martin, Menifee, Morgan, Owsley, Perry, Powell, Russell, Wayne, Wolfe, and other mountain counties.

Loblolly Pine, Oldfield Pine (*Pinus taeda*).—This is a large pine with cones four inches long and leaves five and a half or more inches in length. Its habitat is the sandy region along the South Atlantic Coast and Texas. In the interior it reaches Arkansas and Eastern Tennessee. It is not common in Kentucky, if it occurs at all now, but may be looked for in the mountains of the southeastern part of the State. It is listed by DeFriese in his Geological Survey Report, but some doubt applies to his determination, since it has not been encountered by other more thorogoing botanists.

Pitch Pine (*Pinus rigida*).—Occurs in and near the Cumberland Mountains and is not to be seen elsewhere, except in cultivation. It has been observed in the following counties:

Bath, Boyd, Bullitt, Casey, Crittenden, Elliott, Estill, Hart, Jessamine, Johnson, Knott, Laurel, Lawrence, Leslie, Letcher, Martin, Menifee, Nelson, Perry, Rockcastle, Rowan, Whitley.

Table Mountain Pine (*Pinus pungens*).—This small pine occurs in the Cumberland Mountains of Southeastern Kentucky. Its cones are characterized by long spines, sometimes nearly a quarter of an inch in length. Recorded by DeFriese. It is common in Eastern Tennessee, according to Dr. Gattinger.

Hart, Leslie, Morgan and Russell counties.

Scrub Pine (*Pinus virginiana*).—One of the commonest and most widely distributed of the pines of Eastern Kentucky.

Boyd, Boyle, Bullitt, Casey, Edmonson, Elliott, Fleming, Floyd, Hart, Jessamine, Laurel, Leslie, Lincoln, Martin, Menifee, Monroe, Montgomery, Morgan, Owsley, Powell, Russell, Whitley.

Yellow Pine (*Pinus echinata*).—Slopes of Pine Mountain.

Boyle, Casey, Clinton, Elliott, Estill, Fleming, Floyd, Knott, Knox, Laurel, Leslie, Madison, Martin, Montgomery, Morgan, Owsley, Perry, Pike, Powell, Pulaski, Rockcastle, Rowan.

Long-leaved or Georgia Pine (*Pinus palustris*).—Altho DeFriese includes this as a Kentucky species, its distribution outside Kentucky renders his determination doubtful. No one else so far as I know claims to have seen it so far north. Even Gattinger fails to mention it as a Tennessee plant. If here it will probably be found in the vicinity of Pound Gap, where DeFriese claims to have observed it.

Hemlock (*Tsuga canadensis*).—A large tree, sometimes seventy-five feet in height, common in shaded ravines in the mountains of Eastern Kentucky, and occurring westward locally along Green River to Edmonson County, and then northward in gullies well toward the Ohio River.

Bath, Bell, Boyd, Clinton, Edmonson, Elliott, Estill, Fleming, Harlan, Hart, Johnson, Knott, Knox, Laurel, Leslie, Letcher, Menifee, Montgomery, Morgan, Owsley, Perry, Pike, Powell, Pulaski, Rowan, Wayne, Whitley, Wolfe.

Swamp or Bald Cypress (*Taxodium distichum*).—A large tree found wild only in swamps, but occurring locally along the Ohio River, becoming common in the bottoms of the Mississippi on the west. The small, light green leaves are shed in the fall. The cones are small, globular, with the peculiar scales meeting at the edges. Produces a valuable lumber much used in hothouse construction. Several transplanted trees of medium size are growing on premises about Lexington. They do well, excepting during very dry seasons from which they suffer more than most other trees.

Ballard, Crittenden, Daviess, Fulton, Gallatin, Graves, Henderson, Hickman, Livingston, McCracken, McLean, Muhlenberg, Trigg, Union, Webster.

? Arbor Vitae (*Thuja occidentalis*).—Credited to Kentucky in both M'Murtrie's and Short and Peter's lists. To be looked for in the mountains. I have never seen it in any of my numerous trips to mountain counties. The tree is a favorite for lawns and is common in cultivation.

Red Cedar, Cedar (*Juniperus virginiana*).—Our commonest and most widely distributed evergreen, occurring from the Big Sandy to Hickman County. The staminate catkins, 4 mm. by 2 mm., observed April 14.

Adair, Allen, Ballard, Bath, Bell, Barren, Bourbon, Boyd, Boyle, Breathitt, Breckinridge, Bullitt, Butler, Campbell, Carroll, Casey, Christian, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Fulton, Franklin, Gallatin, Garrard, Grant, Green, Hancock, Hardin, Hart, Henderson, Hickman, Jefferson, Jessamine, Johnson, Knott, Knox, Lawrence, Leslie, Letcher, Lincoln, Livingston, Logan (extremely common, April 14, 1895, 45-50 ft. high), Madison, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Powell, Rockcastle, Scott, Shelby, Spencer, Simpson, Taylor, Todd, Trigg, Trimble, Wayne, Whitley, Woodford.

Lily Family (*Liliaceae*).

The species entered under this family are sometimes made a separate family, the Smilaceae. They are commonly known as catbriers, green briers, etc., the species not being closely discriminated, tho sometimes familiar enough on farms as weedy growths in meadows and orchards.

Green Brier (*Smilax rotundifolia*).—Common.

Bell, Fayette, Harlan, Hickman, Henderson, Livingston, Rockcastle and Warren counties.

Saw Brier (*Smilax gauca*).—

Bell, Harlan, Menifee and Warren counties.

Smilax bona-nox.—

Livingston, Warren.

Smilax hispida.

Smilax pseudo-china.

Willow Family (*Salicaceae*).

Black Willow (*Salix nigra*).

Ward's Willow (*Salix wardi*).—
Kentucky (Gray's Manual).

Shining Willow (*Salix lucida*).—
Kentucky (Britton).

Crack Willow (*Salix fragilis*).

Sand-bar Willow (*Salix longifolia*).

Salix cordata.

Glaucous Willow (*Salix discolor*).

Salix petiolaris.

Dwarf Gray Willow (*Salix tristis*).—Common in Hardin County, at Cecilian, Stithton and Tip Top.

Sage Willow (*Salix candida*).—
Edmonson and Warren counties (Miss Price). Frankfort, Ky.

American Aspen (*Populus tremuloides*).—Short and Peter; Barren and Edmonson (Hussey). Boyle and Mercer (Linney). Not common in Kentucky.

Large-toothed Aspen (*Populus grandidentata*).—Not common. Allen, Barren and Edmonson (Hussey). Gallatin, Hart, Larue, Menifee, Morgan, Ohio, Eastern Kentucky (Crandall).

Downy Poplar (*Populus heterophylla*).—Frequent locally in swamps.
Gallatin, Muhlenberg and Todd counties.

FIG. 5.—STAMINATE BLOSSOMS OF BLACK WALNUT.
NATURAL SIZE.

Cottonwood (*Populus deltoides*).—Not a common Kentucky tree, but somewhat widely distributed in the State.

Ballard, Boyd, Boyle, Bracken, Breckinridge, Bourbon, Butler, Caldwell, Carroll, Crittenden, Daviess, Fleming, Floyd, Fulton, Gallatin, Garrard, Green, Hancock, Hart, Henderson, Hickman, Larue, Leslie, Lewis, Livingston, Logan, Lyon, Menifee, Mercer, McCracken, McLean, Monroe, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen, Pendleton, Rowan, Shelby, Simpson, Spencer, Todd, Trigg, Union, Warren, Webster. Edmonson and Barren (Hussey).

Walnut Family (*Juglandaceae*).

Butternut (*Juglans cinerea*).—A small tree as commonly seen in Kentucky, with ash-gray bark and straggling branches. Not very common anywhere, but has been observed in extreme eastern and extreme western counties. From my notes it appears to be unevenly distributed, occurring in more of the central counties than elsewhere, and being scarce or wanting in the Bluegrass Region and in much of the western third of the State.

Bath, Bell, Bourbon, Boyd, Boyle, Bracken Breckinridge, Campbell, Carroll, Cumberland, Daviess, Estill, Gallatin, Garrard, Grayson, Hancock, Hardin, Hart, Hickman, Jessamine, Johnson, Knott, Larue, Letcher, Lewis, Livingston, Madison, Menifee, Mercer, Monroe, Morgan, Oldham, Pendleton, Perry, Powell, Pulaski, Robertson, Rowan, Scott, Spencer, Webster, Woodford.

Black Walnut (*Juglans nigra*).—Common thruout Kentucky, formerly even more so. A fine tree, producing a valuable dark brown wood. Merchantable trees are rapidly being sought out and destroyed. Easily grown from the nuts. In bloom May 13, 1900, at Lexington.

During the ten years preceding 1899, $5,000,000 are claimed to have been paid for walnut timber sold out of Bluegrass Kentucky. From $10,000 to $15,000 were paid for walnut timber on single farms, and $30,000 is said to have been offered and refused for the walnut on a very large tract in Woodford County.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breathitt, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Christian, Clark, Clinton, Crittenden,

Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Grayson, Green, Hancock, Hardin, Harrison, Hart, Henderson, Henry, Hickman, Jefferson, Jessamine, Johnson, Kenton, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Martin, Mason, McCracken, McLean, Meade, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Woodford, Wolfe.

Pecan (*Carya illinoense*).—This is a large tree pretty closely restricted in Kentucky to bottomlands along the Ohio and Mississippi rivers. Near Columbus in July 21, 1897, it was found rather common, some of the trees three or four feet thru and one hundred feet high. Bark smooth, light gray. Leaflets, 15-17 in number, small compared with those of other hickories.

Ballard, Breckinridge, Carroll, Crittenden, Daviess, Fulton, Gallatin, Hancock, Henderson, Hickman, Livingston, Lyon, McCracken, McLean, Monroe, Ohio, Pulaski, Russell, Todd, Trigg, Union, Webster. Linney, in 1879, credited it to Boyle and Mercer counties.

Shell-bark Hickory (*Carya ovata*).—A common tree, well known to every child from the fine nuts it produces, which are, with the exception of those of the pecan, the best produced by any native tree. Trees observed in Todd County, November 11, 1895, were three feet thru and sixty feet or more high.

Adair, Allen, Ballard, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Clark, Clinton, Christian, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Gallatin, Garrard, Grant, Green, Hancock, Hardin, Harrison, Hart, Henderson, Henry, Hickman, Jessamine, Johnson, Kenton, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Martin, Mason, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Wolfe, Woodford.

Big Shell-bark Hickory (*Carya laciniosa*).—The "King Nut" is common in the State, and its nuts are frequently seen with the smaller ones of the common shell-bark hickory in our markets. Tho large and of fine appearance, they are not so highly prized as are those of the preceding species.

Adair, Allen, Ballard, Barren, Bath, Bourbon, Boyd, Boyle, Bracken, Bullitt, Butler, Campbell, Caldwell, Carroll, Casey, Clinton, Crittenden, Cumberland, Daviess, Elliott, Estill, Fleming, Floyd, Gallatin, Garrard, Grant, Graves, Green, Harrison, Hart, Henderson, Hickman, Johnson, Knott, Knox, Larue, Lawrence, Leslie, Lewis, Livingston, Logan, Lyon, Madison, Mason, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Owsley, Pendleton, Powell, Pulaski, Robertson, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Warren, Washington, Wayne, Webster, Whitley, Woodford.

Mocker-nut Hickory (*Carya alba*).—The tree (sometimes fifty or sixty feet high and a foot or more thru) is to be recognized by the close bark, the nuts by their hard, thick, roundish shell, often of a brownish hue. The kernel is not as palatable as those of either of the preceding species.

Boyd, Casey, Edmonson, Elliott, Estill, Floyd, Gallatin, Greenup, Hickman, Knott, Larue, Laurel, Leslie, Letcher, Livingston, Mason, Menifee, Pendleton, Rockcastle, Scott, Spencer, Todd, Whitley.

Small-fruited Hickory (*Carya microcarpa*).—Credited to the State, and to be looked for in Western Kentucky.

Boyle and Mercer counties (Linney); Warren (Miss Price).

Broom Hickory (*Carya glabra*).—A common tree thruout hilly sections of the State from east to west. Slender, but reaching a height of sixty-five feet.

Christian, Edmonson, Gallatin, Jefferson, Hickman, Logan, Rockcastle and Whitley counties.

Pignut or Bitternut Hickory (*Carya cordiformis*).—Common everywhere and well known from its roundish, bitter nuts.

Ballard, Bath, Bell, Bracken, Boyd, Edmonson, Fayette, Floyd, Gallatin, Logan, Mason, Rockcastle, Todd, Trigg, Washington, Whitley, Woodford.

Birch Family (*Betulaceae*).

Hazelnut (*Corylus americana*).—Not a common Kentucky plant, taking the State as a whole, but widely distributed and likely to be encountered anywhere in small numbers.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Breckinridge, Butler, Caldwell, Campbell, Casey, Christian, Clinton, Crittenden, Daviess, Edmonson, Elliott, Estill, Fleming, Fulton, Gallatin, Garrard, Grant, Graves, Green, Hancock, Hardin, Hart, Henderson, Hickman, Hopkins, Jessamine, Johnson, Knott, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Martin, McCracken, McLean, Mercer, Menifee, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Ohio, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rowan, Russell, Scott, Simpson, Taylor, Todd, Trigg, Union, Warren, Wayne, Webster, Whitley, Wolfe, Woodford.

Hop Hornbeam, Ironwood (*Ostrya virginica*). — Frequent. Known by its fruit which somewhat resembles that of the hop. A tree noted in Whitley County, October 15, 1895, was nine inches thru and forty feet high. Others noted the same year in Shelby County were from twenty-five to thirty feet high.

Ballard, Boyd, Boyle, Butler, Christian, Crittenden, Elliott, Estill, Franklin, Fulton, Gallatin, Grant, Hancock, Hart, Hickman, Jessamine, Knott, Lawrence, Letcher, Livingston, Menifee, Mercer, Metcalfe, Monroe, Morgan, Nelson, Oldham, Owsley, Perry, Pulaski, Rockcastle, Rowan, Simpson, Shelby, Taylor, Trigg, Union, Wayne, Webster, Whitley.

Hornbeam, Ironwood (*Carpinus caroliniana*).—A common tree. Adair, Allen, Ballard, Bath, Bell, Boyle, Casey, Clinton, Christian, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Floyd, Franklin, Gallatin, Green, Hart, Hickman, Hopkins, Johnson, Knott, Larue, Laurel, Leslie, Letcher, Lincoln, Livingston, Lyon, Madison, Meade, Menifee, Mercer, Monroe, Morgan, Ohio, Oldham, Owsley, Pendleton, Perry, Pike, Rockcastle, Rowan, Russell, Shelby, Simpson, Spencer, Taylor, Whitley.

Sweet Birch (*Betula lenta*).—Not very common, taking the State as a whole. Observed by me only in the mountain counties, but reported by correspondents from Hart, Hickman and McLean. Observed to be rather common in moist ravines in Rockcastle County, October 19, 1895.

Bell, Boyd, Estill, Floyd, Johnson, Knott, Knox, Lawrence, Leslie, Letcher, Menifee, Monroe, Morgan, Owsley, Perry, Pike, Rockcastle, Rowan, Trigg, Wayne, Whitley, Wolfe.

Yellow Birch (*Betula lutea*).—
Bath, Gallatin.

River Birch (*Betula nigra*).—Our commonest birch. Pretty closely restricted to the banks of streams.

Ballard, Bath, Bell, Boyd, Boyle, Bullitt, Butler Carroll, Casey, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Floyd, Fulton, Gallatin, Hancock, Hart, Hickman, Hopkins, Knott, Knox, Laurel, Leslie, Letcher, Livingston, Lyon, Martin, McCracken, McLean, Menifee, Monroe, Muhlenberg, Ohio, Owsley, Perry, Pike, Powell, Pulaski, Rockcastle, Rowan, Russell, Spencer, Todd, Union, Warren, Whitley, Wolfe.

Smooth Alder (*Alnus rugosa*).—An alder presumed to be this is common in the mountains of Eastern Kentucky along streams. Miss Price records the species as occurring in Warren County. The leaves vary from broad oval to lanceolate. Alders are common thruout Western Kentucky in wet places. A specimen in the collection from Aden Springs, Carter County, has closely pubescent twigs, and may represent *A. mollis*. Its catkins are immature.

Beech Family (*Fagaceae*).

Beech (*Fagus grandifolia*).—Very common locally, and widely distributed in the State. Not common on the best soils of Bluegrass Kentucky, but a few may be found on Kentucky River even in Fayette County. The "soggy beech flats of eastern Fayette County" have all but disappeared.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Breathitt, Bullitt, Butler, Campbell, Carroll, Casey, Christian, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette (on river), Fleming, Floyd, Fulton, Gallatin, Garrard, Green, Hickman, Hardin, Hopkins, Jessamine, Johnson, Kenton, Knott, Knox, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Martin, Mason, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rock-

castle, Rowan, Russell, Scott (rare), Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Wolfe.

Chestnut (*Castanea dentata*).—Common in soils containing sand; not commonly seen elsewhere except in cultivation. A beautiful tree, well adapted to park and lawn, and furnishing valuable lumber.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Breckinridge, Breathitt, Bullitt, Butler, Caldwell, Casey, Christian, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fleming, Floyd, Garrard, Grayson, Green, Hancock, Greenup, Hardin, Hart, Henderson, Hickman, Jessamine, Johnson, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Logan, Madison, Marion, Martin, McLean, Menifee, Monroe, Montgomery, Morgan, Nelson, Ohio, Oldham, Owen, Owsley, Perry, Pike, Powell, Pulaski, Rockcastle, Rowan, Russell, Simpson, Spencer, Taylor, Todd Trigg, Trimble, Warren, Wayne, Webster, Whitley, Wolfe.

Chinquepin Chestnut (*Castanea pumila*).—A dwarf tree or shrub confined pretty closely to the south central part of the State and to a few mountain counties. Not common.

Adair, Clinton, Floyd, Garrard, Green, Knott, Leslie, Letcher, Metcalfe, Owsley, Perry, Pike, Pulaski, Russell, Simpson, Warren, Wayne.

White Oak (*Quercus alba*).—Formerly common and generally distributed. Merchantable trees now largely cut out. A splendid tree often of large size.

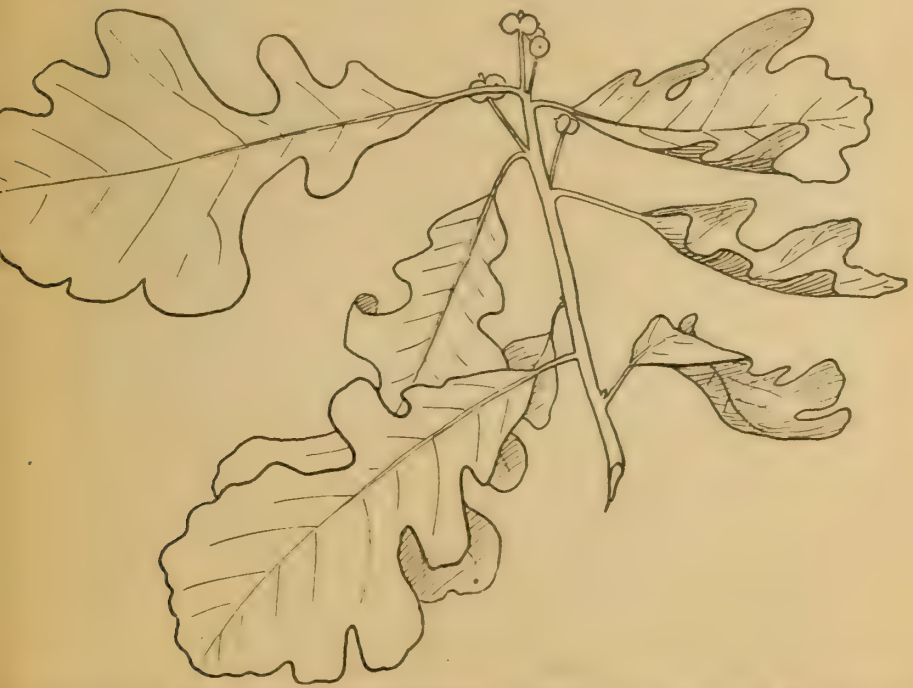
Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Christian, Clark, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Grayson, Graves, Green, Greenup, Hancock, Hardin, Harrison, Hart, Henderson, Henry, Hickman, Hopkins, Jefferson, Jessamine, Johnson, Kenton, Knott, Knox, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Martin, Marshall, Mason, McCracken, McLean, Meade, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Rockcastle, Robertson, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Tay-

Fig. 6.—Showing Characteristics of Bark of the two Common Oaks of Bluegrass Kentucky. A., Chinquepin Oak (*Quercus muhlenbergii*); B.,Bur Oak (*Q. macrocarpa*). Photographed by H. Garman.

lor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Wolfe.

Post Oak (*Quercus stellata*).—A small oak with a leaf bearing a general resemblance to that of the bur oak, but with a rough upper surface. Very common in some of the southern counties. The acorn is small and the cup without fringe.

Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Breckinridge, Bullitt, Butler, Caldwell, Casey, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fleming, Floyd, Fulton, Gallatin, Garrard, Graves, Green, Hancock, Hardin, Hart, Henderson, Hickman, Johnson, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Livingston, Logan, Lyon, Madison, Marion, McCracken, McLean, Meade, Menifee, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham (?), Owsley, Perry, Powell, Pulaski, Rockcastle, Rowan, Russell, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Wayne, Webster, Whitley.



7.—Leaves and Young Acorns of the Bur Oak (*Quercus macroacarpa*). Natural size

Overcup Oak (*Quercus lyrata*).—Found only in swamps and thus somewhat local in distribution. The leaf bears a general resemblance to that of the bur oak. The cup often nearly encloses the acorn.

Gallatin, Graves, Greenup, McCracken.

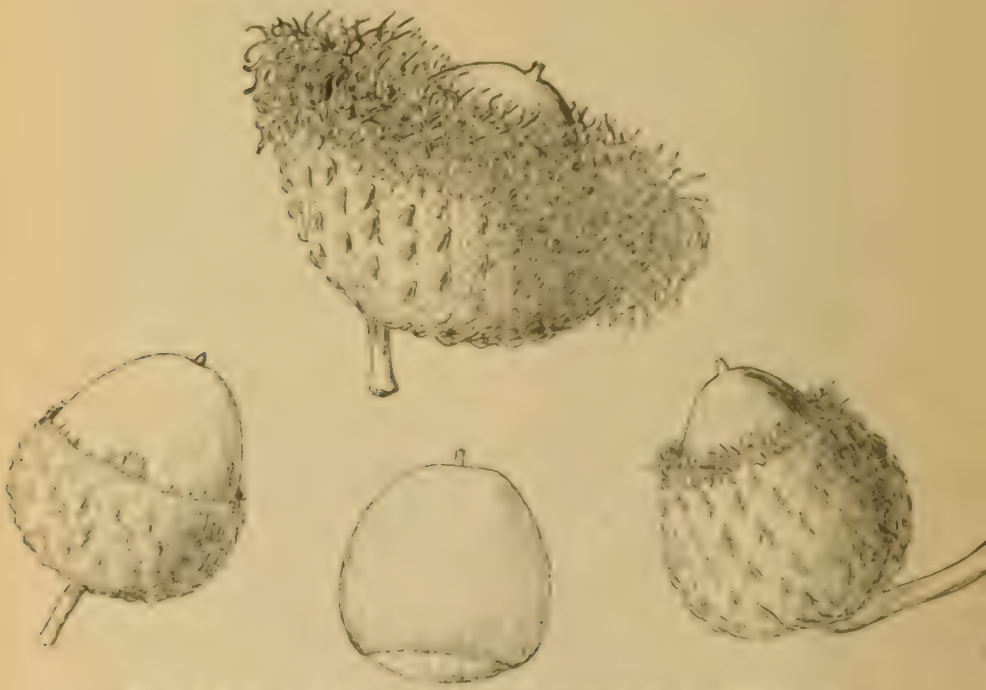


FIG. 8.—ACORNS OF BUR OAK (*Quercus macrocarpa*). NATURAL SIZE.

Bur Oak (*Quercus macrocarpa*).—One of the commonest and most characteristic trees of Bluegrass Kentucky, but occurs in numbers elsewhere in the State. Well known from its big acorns with mossy fringed cups.

Ballard, Bath, Bourbon, Boyd, Boyle, Breckinridge, Bullitt, Butler, Carroll, Casey, Clark, Clinton, Crittenden, Cumberland, Daviess, Elliott, Estill, Fayette, Fleming, Floyd, Gallatin, Garrard, Grant, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Larue, Laurel, Leslie, Livingston, Logan, Lyon, Madison, Marion, Mason, McCracken, McLean, Menifee, Mercer, Montgomery, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Powell,

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 9.—Acorns of Swamp White Oak (*Quercus bicolor*). Fig. 10—Acorns of Basket Oak (*Q. michauxii*). Fig. 11.—Acorns of Pin Oak (*Q. palustris*). All of Natural Size.

Pulaski, Robertson, Scott, Shelby, Simpson, Spencer, Taylor, Trimble, Union, Warren, Wayne, Webster, Woodford.

Swamp White Oak (*Quercus bicolor*).—A large swamp-frequenting tree, with whitish gray bark somewhat like that of the common white oak. The leaf is, however, more like that of the chestnut oak, being oval in general form, rather coarsely scalloped or toothed, the projections round. The acorn has a long stem which is attached obliquely. Noted as very common and large at Nortonville, September 12, 1899, where it was associated with *Q. palustris* and *Q. michauxii.*

Adair, Crittenden, Daviess, Fulton, Gallatin, Hickman, Hopkins, Livingston, Lyon, McCracken, McLean, Muhlenberg, Ohio, Simpson, Taylor, Trigg, Union, Warren, Wayne, Webster, Whitley.

Cow Oak, Basket Oak (*Quercus michauxii*).—A large tree, common locally on low ground. Acorns large, with wide, shallow cup. Common in 1895 about Nortonville, trees two and one-half feet thru and sixty to seventy feet high being observed.

Hopkins, Warren.

Chinquepin Oak (*Quercus muhlenbergii*).—A common oak in Bluegrass Kentucky. The leaves are more like those of the chestnut than are those of the next species. The acorns are much smaller.

Adair, Allen, Barren, Bath, Bourbon, Boyd, Boyle, Breckinridge, Butler, Campbell, Carroll, Casey, Clark, Clinton, Daviess, Edmonson, Fayette, Franklin, Gallatin, Garrard, Green, Hancock, Hardin, Harrison, Hart, Hickman, Jessamine, Kenton, Knott, Larue, Laurel, Leslie, Letcher, Livingston, Logan, Lyon, Madison, Martin, McLean, Mercer, Metcalfe, Nelson, Ohio, Oldham, Owen, Owsley, Perry, Pike, Powell, Robertson, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Trigg, Trimble, Union, Warren Wayne, Whitley, Woodford.

Chestnut Oak (*Quercus prinus*).—Frequent on ridges and hill-tops, especially common in Rockcastle and Whitley and again in Edmonson County.

Adair, Bath, Boyd, Boyle, Breckinridge, Bullitt, Butler, Campbell, Casey, Clinton, Crittenden, Cumberland, Edmonson, Elliott, Estill, Fleming, Floyd, Gallatin, Garrard, Grayson, Hancock, Hart,

Henderson, Hickman, Jefferson, Johnson, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Madison, Marion, Martin, Meade, Menifee, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Oldham, Ohio, Owsley, Perry, Pike, Powell, Pulaski, Rockcastle, Rowan, Russell, Taylor, Trigg, Wayne, Whitley, Wolfe.

Red Oak (*Quercus rubra*).—A well known Kentucky tree, but not now as common as are several other oaks, probably because it is preferred by the lumbermen.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Christian, Clark, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Fulton, Gallatin, Garrard, Grant, Grayson, Graves, Green, Hancock, Hardin, Harrison, Hart, Henderson, Henry, Hickman, Jefferson, Jessamine, Johnson, Kenton, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Marshall, Martin, Mason, McCracken, McLean, Meade, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley.

Swamp or Pin Oak (*Quercus palustris*).—Occurs only in swamps where it is associated with a few other water-loving species of the same genus. The leaves are deeply cut into narrow, toothed divisions, about five in number. The acorn is small, the cup somewhat smooth, wide and shallow.

Gallatin, Henderson, Lyon, McCracken, McLean, Muhlenberg, Ohio, Webster.

Scarlet Oak (*Quercus coccinea*).—Observed on ridges and hills commonly.

Bath, Boyd, Christian, Edmonson, Fleming, Gallatin, Hopkins, Jessamine, Logan, Oldham, Pulaski, Rockcastle, Todd, Whitley.

Texas Red Oak (*Quercus texana*).—

Fayette, Warren, and doubtless other counties.

Black Oak (*Quercus velutina*).—A common tree, with dusky bark and coarse large leaves.

Allen, Adair, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Clinton, Crittenden, Cumberland, Daviess, Elliott, Estill, Fulton, Gallatin, Garrard, Grant, Graves, Grayson, Green, Hancock, Hardin, Hart, Henderson, Hickman, Jefferson, Jessamine, Johnson, Knott, Knox, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Mason, McCracken, McLean, Meade, Menifee, Mercer, Metcalfe, Monroe, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Oldham, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rowan, Russell, Scott, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Wolfe.

Spanish Oak (*Quercus falcata*).—This is one of the most characteristic oaks of the southern counties, but extends northward on the west to the Ohio River. The foliage is very variable with age of tree and location.

Allen, Ballard, Bell, Boyle, Butler, Caldwell, Casey, Clinton, Crittenden, Cumberland, Daviess, Graves, Green, Hardin, Hart, Henderson, Hickman, Larue, Laurel, Lawrence, Leslie, Letcher, Livingston, Logan, Lyon, Marshall, McCracken, McLean, Monroe, Muhlenberg, Ohio, Oldham, Owsley, Perry, Pulaski, Rowan, Russell, Taylor, Todd, Trigg, Warren, Wayne, Webster, Whitley.

Bear Oak (*Quercus ilicifolia*).—
Kentucky (Gray's Manual); also DeFriese.

Water Oak (*Quercus nigra*).—
Kentucky (Gray's Manual).

Black Jack Oak (*Quercus marilandica*).—A small tree, common especially on poor soils of Southwestern Kentucky.

Adair, Allen, Ballard, Barren, Bath, Boyd, Boyle, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Casey, Christian, Clinton, Crittenden, Cumberland, Elliott, Estill, Fleming, Fulton, Garrard, Graves, Green, Hardin, Hart, Henderson, Hickman, Johnson, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Martin, Meade, McCracken, McLean, Menifee, Metcalfe, Monroe, Montgomery, Nelson, Nicholas, Ohio, Owsley, Perry, Pike, Powell, Pu-

laski, Robertson, Rowan, Russell, Shelby, Simpson, Taylor, Todd, Trigg, Union, Warren, Wayne, Webster, Wolfe.

Laurel Oak (*Quercus imbricaria*).—This small oak is one of the handsomest occurring in the State. It was noted in November, 1895, as extremely common in Logan County.

Christian, Fayette, Gallatin, Hardin, Hart, Jessamine, Kenton, Lewis, Livingston, Logan, Madison, Marshall, Meade, Monroe, Nelson, Taylor, Todd.

Willow Oak (*Quercus phellos*).—This singular oak is common only in the southern tier of counties, where it often reaches a large size. Examples have been noted in Whitley County two feet thru and seventy-five feet in height. It is generally found on flat and rather wet land.

Ballard, Christian, Clinton, Daviess, Fleming, Fulton, Gallatin, Graves, Hart, Hickman, Knox, Laurel, Lincoln, Monroe, Todd, Trigg, Wayne, Webster, Whitley.

Elm Family (*Urticaceae*).

Slippery Elm (*Ulmus fulva*).—A common tree, sometimes seen on lawns and in parks.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Butler, Caldwell, Campbell, Carroll, Casey, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Grayson, Green, Greenup, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Jefferson, Jessamine, Johnson, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Martin, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Wolfe, Woodford.

White Elm (*Ulmus americana*).—Our most beautiful elm; equals in beauty of form any tree planted in this country. A common Kentucky tree. In bloom March 31, 1895, at Lexington. Seeds ripe May 4, of same year.

Adair, Ballard, Barren, Bath, Bourbon, Boyd, Boyle, Breckinridge, Campbell, Carroll, Casey, Christian, Clinton, Cumberland Daviess, Estill, Fayette, Floyd, Franklin, Fulton, Edmonson, Gallatin, Garrard, Grant, Green, Hardin, Harrison, Henderson, Hickman, Jessamine, Kenton, Knott, Leslie, Lewis, Livingston, Lyon, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Oldham, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Trigg, Union, Webster, Woodford.

Cork or Rock Elm (*Ulmus racemosa*).—Not a common tree in Kentucky at present. I have seen more of it along cliffs on Kentucky River than elsewhere in the State. It can be recognized by the irregular corky growths of the branches, and its glossy many-veined leaves of medium or rather large size.

Bell, Fayette, Gallatin, Jessamine.

Ulmus serotina.—Rockcastle County, along Roundstone Creek, October 9, 1895, a tree presumed to be this, sixty feet high and fifteen inches in diameter of trunk. Twigs corky.

Winged Elm (*Ulmus alata*).—A small tree, common in southern and western counties. Easily recognized by the flat corky ridges, often one on each side of a twig. Leaves small.

Bell, Boyle, Breckinridge, Casey, Campbell, Christian, Clinton, Edmonson, Hart, Hickman (common), Logan, McCracken, Muhlenberg, Nelson, Ohio, Perry, Rockcastle, Spencer, Todd, Wayne, Whitley.

Water Elm (*Planera aquatica*).—This is a small tree, occurring in swamps. The leaves somewhat resembling those of the elms, are very small.

Boyle and Mercer (Linney). Webster.

Hackberry (*Celtis occidentalis*).—A common tree thruout Kentucky. The variety *crassifolia* is the prevailing form in Bluegrass Kentucky.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey,

Clark, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Estill Fayette, Fleming, Franklin, Gallatin, Garrard, Grant, Green, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Jefferson Jessamine, Johnson, Kenton, Knott, Larue, Lawrence, Leslie, Letcher, Lincoln, Livingston, Logan, Lyon, Madison, Mason, McCracken, McLean, Menifee, Mercer, Monroe, Montgomery, Morgan Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Rockcastle, Russell, Scott, Shelby, Simpson, Spencer, Trigg, Trimble, Union, Washington, Wayne, Webster, Woodford.

Dwarf Hackberry (*Celtis georgiana*).—A shrub three to four feet high. Leaves entire, one-sided. Berries about 0.25 inch in diameter and 0.28 inch in length. Rocky soil in Nelson County. June 29, 1898.

Mississippi Hackberry (*Celtis mississippiensis*).—Easily recognized by its narrow, smooth, entire leaves. Common only along the Mississippi River in the western part of the State, but collected by me recently along Benson Creek in Franklin County, showing that it may by close collecting be encountered along streams thruout much of the State.

Franklin, Fulton, Hickman.

Red Mulberry (*Morus rubra*).—The tree is moderately common in Kentucky, but generally occurs singly or a few in a place, never constituting any large proportion of the woody growth.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Clark, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fleming, Floyd, Franklin, Fulton, Garrard, Grant, Green, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Jessamine, Johnson, Kenton, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Martin, Mason, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Wolfe, Woodford.

FIG. 12.—MISTLETOE (*Phoradendron flavescens*).
NATURAL SIZE.

Sandalwood Family (*Santalaceae*).

Oil Nut (*Pyrularia pubera*).—A straggling shrub occasionally seen among undergrowth in mountain forests.

Bell, Harlan, Powell.

Mistletoe Family (*Loranthaceae*).

Mistletoe (*Phoradendron flavescens*).—A very common plant parasite in most of the State. In Bluegrass Kentucky largely restricted to black walnut, but occurring less often on black locust, American elm and other trees. In Western Kentucky it is not so closely confined to walnut. Exceptionally severe winters sometimes destroy much of it, but it gradually reappears and becomes common again. The fine green foliage and handsome translucent berries render it a favorite for Christmas decorations, and it is often seen in quantities in our market.

The common blue bird (*Sialia sialis*) seems to be an important agent in its dissemination. The greater part of the food of this bird consists at times in midwinter of mistletoe berries. The mucilaginous substance surrounding the seeds no doubt adheres to its beak and is rubbed off on twigs and branches where on drying it fastens some of the seeds down securely.

Ballard, Boyle, Fayette, Franklin, Hancock, Jefferson, Johnson, Mercer, McCracken (frequent on black gum), Nelson, Todd, Woodford.

Birthwort Family (*Aristolochiaceae*).

Dutchman's Pipe (*Aristolochia macrophylla*).—A trailing, shrubby plant.

Greenup, Warren.

Aristolochia tomentosa.—A trailing shrub or vine.

Warren (Miss Price).

Crowfoot Family (*Ranunculaceae*).

Clematis (*Clematis virginiana*).—A vine, commonly clambering over shrubby growths.

Bell, Boyle, Fayette, Harlan, Hopkins, Lawrence, Mercer, Warren.

Leather Flower (*Clematis viorna*).—A vine.
Fayette, Warren.

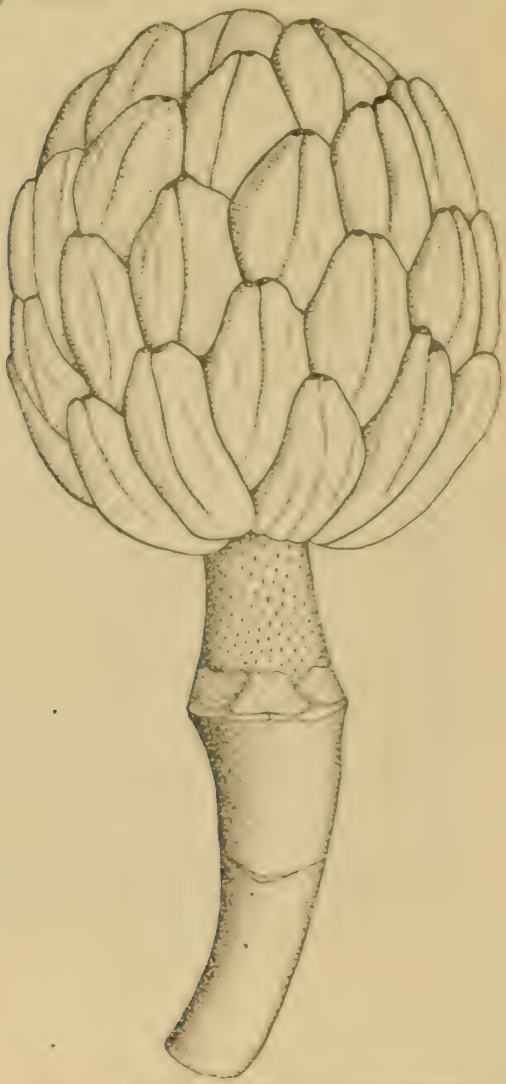


FIG. 13.—FRUIT OF GREAT-LEAVED MAGNOLIA (*Magnolia macrophylla*). NATURAL SIZE.

Magnolia Family (*Magnoliaceae*).

Cucumber Tree (*Magnolia acuminata*).—A large tree, sixty to eighty feet high, occurring thruout the State from eastern to western boundaries. Leaves small relatively to those of the next two species, measuring in a specimen before me eleven and a half inches long by seven inches wide; shape, oval. The flower also is small, the petals one and a half to two inches long.

Bell, Boyle, Edmonson, Mercer, Powell, Rockcastle, Warren. Whitley.

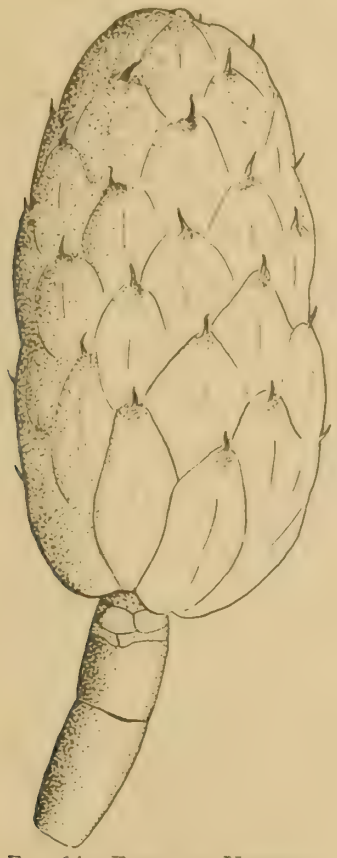


FIG. 14.—FRUIT OF UMBRELLA TREE (*Magnolia tripetala*). NATURAL SIZE.

Great-leaved Magnolia, Elkwood (*Magnolia macrophylla*).—A small tree of somewhat straggling growth, with fine large white flowers and globular fruit. Common in mountain counties, and observed by me on one occasion west of Mammoth Cave. The leaves are very large, sometimes measuring in fresh specimens twenty-four inches long by fifteen wide, the greatest width being beyond the middle, the base contracting to a small auricle. Bright green above, decidedly glaucous whitish beneath. Very common along Troublesome Creek.

Bell, Edmonson, Jackson, Knott, Rockcastle, Powell, Whitley, Wolfe, and other mountain counties.

Umbrella Tree (*Magnolia tripetala*).—A small tree with large, crowded leaves, actually used at times as umbrellas. Common in the mountain counties, and observed in Warren and Edmonson counties, where it is locally common. 10—20 feet high. Leaves are lanceolate, tapering to both extremities and without auricles. Examples measure thirteen and a half by six and a half inches, the greatest width being toward the base. In bloom May 26, 1895, at Jackson in Breathitt County. Petals yellowish, creamy white, or faintly rose-color; five inches long and two inches wide.

Bell, Breathitt, Butler, Edmonson, Powell, Rockcastle, Warren, Whitley, Wolfe, and other neighboring counties.

Ear-leaved Magnolia (*Magnolia fraseri*).—This tree is frequently credited to Kentucky as observed in the eastern part of the State. Kearney records it as from Bell and Harlan. I have seen it in cultivation, but have looked for it repeatedly without success in localities in which it is said to occur. *M. macrophylla* might in some conditions be mistaken for it, but its globular fruit should enable any one to discriminate, that of *M. fraseri* being elongate.

Tulip Poplar, Yellow Poplar (*Liriodendron tulipifera*).—A common tree throughout Kentucky, formerly providing large quantities of valuable lumber. Flowers tulip-like, green and orange. Ornamental, and well adapted for shade and lawn purposes. A magnificent forest tree, the trunk sometimes with a diameter of six or seven feet. The "State Tree."

Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Breathitt, Christian, Daviess, Edmonson, Estill, Fayette, Floyd, Fulton, Gallatin, Garrard, Graves, Grayson, Green, Greenup, Hardin, Hickman, Hopkins, Jefferson, Jessamine, Lincoln, Livingston, Mason, Menifee, Mercer, Monroe, Morgan, Muhlenberg, Ohio, Powell, Rockcastle, Scott, Trigg, Webster, Whitley, Wolfe, Woodford.

Calycanthus Family (*Calycanthaceae*).

Carolina Allspice (*Calycanthus floridus*).—A shrub with fragrant flowers.

Bell and Harlan counties (Kearney).

Custard-apple Family (*Anonaceae*).

Papaw (*Asimina triloba*).—Occurs thruout Kentucky. Common.

Ballard, Bell, Boyd, Boyle, Breckinridge, Daviess, Edmonson, Fayette, Fleming, Gallatin, Grayson, Greenup, Jessamine, Lincoln, Mason, Mercer, Powell, Rockcastle, Whitley, Woodford.

Moonseed Family (*Menispermaceae*).

Cocculus carolinus.—A vine.

Christian, Jefferson.

Moonseed (*Menispermum canadense*).—A vine.

Bell, Boyd, Fayette.

Cupseed (*Calycocarpum lyoni*).—An extensive vine.

Laurel Family (*Lauraceae*).

Sassafras (*Sassafras variifolium*).—A common tree everywhere in Kentucky. Young growth is troublesome at times because of its persistence in orchards and pastures.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breathitt, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Casey, Christian, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fleming, Floyd, Fulton, Gallatin, Garrard, Grant, Graves, Grayson, Green, Hancock, Hardin,

Harrison, Hart, Henderson, Hickman, Jessamine, Johnson, Kenton, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Martin, Mason, McCracken, McLean, Meade, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Wolfe, Woodford.

Spice Bush (*Benzoin aestivale*).—A moderately common shrub, the bark with an aromatic spicy flavor.

Adair, Allen, Bath, Boyd, Boyle, Breckinridge, Butler, Campbell, Carroll, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fleming, Floyd, Fulton, Gallatin, Garrard, Grant, Green, Hancock, Hardin, Hart, Henderson, Hickman, Jessamine, Johnson, Kenton, Knott, Larue, Laurel, Letcher, Lincoln, Livingston, Madison, McLean, Metcalfe, Monroe, Morgan, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rowan, Russell, Shelby, Simpson, Spencer, Todd, Trigg, Union, Wayne, Webster, Whitley, Wolfe, Woodford.

Benzoin melissaefolium.—
Boyle and Mercer (Linney).

Saxifrage Family (*Saxifragaceae*).

Wild Hydrangea (*Hydrangea arborescens*).—A small shrub, common in rocky ground in the mountains and along streams elsewhere.

Bell, Edmonson, Fayette, Jessamine, Lincoln, Nelson, Warren, Woodford.

Wild Gooseberry (*Ribes cynosbati*).—Not common.

Brooklyn Bridge, Jessamine County; ravines along Kentucky River, Boyle and Mercer counties (Linney).

Wild Gooseberry (*Ribes gracile*).—Not common, but apparently the commonest of the Kentucky species.

Fayette, Franklin, Hardin.

Fig. 15.—Blossoms of the Sweet Gum (*Liquidambar styraciflua*). Reduced one-sixth.

? Wild Gooseberry (*Ribes rotundifolium*).—Included on the authority of Linney. I have not recognized it. Gattinger reports it from the summits of Roane and Smoky Mountains in Tennessee.

Wild Black Currant (*Ribes floridum*).—Short and Peter's list. It is a common plant in damp woods northward. I have not seen it here. Should be looked for in Western Kentucky.

Witch Hazel Family (*Hamamelidaceae*).

Witch Hazel (*Hamamelis virginiana*).—A rather common tree of small size growing along banks of streams and in openings of woods.

Adair, Allen, Ballard, Bath, Bell, Boyd, Carter, Edmonson, Elliott, Estill, Fayette, Floyd, Franklin, Gallatin, Garrard, Green, Hart, Jessamine, Johnson, Knott, Leslie, Letcher, Lincoln, Livingston, McLean, Metcalfe, Monroe, Morgan, Ohio, Oldham, Owsley, Perry, Powell, Rockcastle, Rowan, Russell, Warren, Whitley, Wolfe, Woodford.

Sweet Gum (*Liquidambar styraciflua*).—One of our handsomest trees, the fine star-shaped leaves coloring agreeably in the fall. Occurs thruout the State, but partial to rather damp soil, and hence generally seen along streams in Eastern Kentucky. In the west it sometimes constitutes a large proportion of the woody growth on wet flats.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyle, Bracken, Breathitt, Breckinridge, Butler, Caldwell, Campbell, Carroll, Casey, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fleming, Floyd, Fulton, Gallatin, Garrard, Graves, Green, Hancock, Hart, Henderson, Hickman, Hopkins, Jessamine, Knott, Knox, Laurel, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, McCracken, McLean, Metcalfe, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rowan, Russell, Simpson, Spencer, Taylor, Todd, Trigg, Union, Warren, Wayne, Webster, Whitley.

FIG. 16.—LEAVES, SEEDS AND SEED-BALL OF SYCAMORE (*Platanus occidentalis*). REDUCED.

Plane Tree Family (*Platanaceae*).

Sycamore (*Platanus occidentalis*).—Common along streams, but able to maintain itself almost anywhere. A magnificent tree, with fine white branches when the outer bark exfoliates.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breathitt, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Christian, Clark, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Graves, Grayson, Green, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Hopkins, Jessamine, Johnson, Kenton, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Martin, Mason, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan,

Muhlenberg, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Wolfe, Woodford.

Rose Family (*Rosaceae*).

Nine-bark (*Physocarpus opulifolius*).—A shrub.
Jessamine, Warren. Boyle and Mercer (Linney).

Spiraea corymbosa.—A shrub. Short and Peter. Hussey.

Spiraea salicifolia.—A shrub. Short and Peter.

Spiraea tomentosa.—A shrub.
Edmonson, Todd, Warren.

Narrow-leaved Crabapple (*Pyrus angustifolia*).—A small tree, not uncommon in Western Kentucky. The abundant rose-colored blossoms make it, with the next, a desirable plant for parks and lawns.

Fayette, Fulton, Henderson, Muhlenberg, Todd, Trigg, Webster.

Common Crabapple (*Pyrus coronaria*).—Widely distributed. A fine tree ten feet high was observed October 12, 1895, at Livingston in Rockcastle County. It is not as common as the preceding.

Red Chokeberry (*Pyrus arbutifolia*).—A shrub.
Bell and Harlan (Kearney); Warren (Miss Price).

Black Chokeberry (*Pyrus melanocarpa*).—Kentucky (Miss Price).

? Mountain Ash (*Pyrus americana*).—Frequent in cultivation. Credited to Kentucky by Linney. I have not seen it growing wild in the State. It is a common tree north.

Service Berry (*Amelanchier canadensis*).—Frequent and widely distributed. A shrub or small tree.

Adair, Ballard, Barren, Bath, Boyd, Boyle, Breckinridge, Butler, Caldwell, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Estill, Gallatin, Garrard, Green, Hancock, Hart, Hickman, Johnson, Knott, Knox, Laurel, Lawrence Letcher, Lincoln, Livingston, Lyon, Madison, McCracken, McLean, Menifee, Monroe, Morgan, Nelson, Ohio, Owen, Owsley, Pendleton, Perry, Pike, Powell, Rowan, Russell, Spencer, Taylor, Trigg, Trimble, Warren, Woodford.

Amelanchier oblongifolia.—Have not seen this species. Kentucky (Linney and DeFriese).

Red Haw (*Crataegus crus-galli*).—
Bell, Boyle, Gallatin, Rockcastle, Warren.

? Red Haw (*Crataegus coccinea*).—
Caldwell, Harlan, Warren. Bell (Kearney).

Red Haw (*Crataegus tomentosa*).—Kentucky (Gray's Manual).

Red Haw (*Crataegus polita*).—Lexington, Kentucky.

Red Haw (*Crataegus mollis*).—Mason.

Red Haw (*Crataegus phaenopyrum*).—Crittenden, Todd.

Red Haw (*Crataegus chapmani*).—S. Kentucky, frequent (Gray).

Black Raspberry (*Rubus occidentalis*).—Frequent on banks along streams and elsewhere.

Christian, Edmonson, Fayette, Franklin, Whitley, Warren, Woodford.

Purple Flowering Raspberry (*Rubus odoratus*).—Frequent in the eastern part of the State and in hilly regions westward.

Bell, Franklin, Harlan.

FIG. 17.—LEAVES AND BLOSSOMS OF THE WILD BLACK RASPBERRY (*Rubus occidentalis*).

Mountain Blackberry (*Rubus allegheniensis*).—Powell.

Tall Southern Blackberry (*Rubus andrewsianus*).—Apparently our common species, and distributed thruout most of the State.

Fayette, Laurel, Knox, Todd.

Dewberry (*Rubus procumbens*).—Bath.

Dewberry (*Rubus hispidus*).—Bath.

Climbing Wild Rose (*Rosa setigera*).—Common.
Boyle, Bath, Mason, Warren.

Swamp Rose (*Rosa carolina*).—Frequent.
Mason, Todd, Trigg, Warren.

Dwarf Wild Rose (*Rosa humilis*).—Common locally.
Bell, Boyle, Jessamine, Knox.

Wild Black Cherry (*Prunus serotina*).—Common thruout the State. A fine tree with well known black edible fruit. The wilted leaves are sometimes charged with poisoning stock.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Butler, Bullitt, Caldwell, Campbell, Carroll, Casey, Clinton, Crittenden, Cumberland, Daviess, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Graves, Green, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Jefferson, Jessamine, Johnson, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lincoln, Livingston, Logan, Madison, Mason, McCracken, McLean, Menifee, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owsley, Pendleton, Perry, Powell, Pulaski, Robertson, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Whitley, Woodford.

Choke Cherry (*Prunus virginiana*).—This cherry has been observed by me at only one place in the State, on the North Elkhorn Creek in Fayette County. It is reported from Gallatin County by Mr. J. F. Donaldson. I should like to receive information concerning its occurrence elsewhere in the State. It is a common shrubby tree along the shores of Lake Michigan.

Red or Bird Cherry (*Prunus pennsylvanica*).—This is another nothern species which seems to have been noted by Professor Crandall and others in Eastern Kentucky. It is a small tree with small coral red berries. Should be pleased to know more about it as a Kentucky plant. Certainly not common.

? Chickasaw Plum (*Prunus angustifolia*).—
Boyle and Mercer (Linney).

Common Wild Plum (*Prunus americana*). — Frequent in thickets.

Adair, Allen, Ballard, Bath, Bourbon, Boyd, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Christian, Clark, Crittenden, Daviess, Edmonson, Elliott, Estill, Fayette, Floyd, Fulton, Gallatin, Garrard, Grant, Green, Greenup, Hancock, Harrison, Hart, Henderson, Hickman, Hopkins, Jessamine, Johnson, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Mason, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Warren, Washington, Wayne, Webster, Whitley, Wolfe, Woodford.

Pulse Family (*Leguminosae*).

Kentucky Coffee Tree (*Gymnocladus dioica*).—A common tree in Kentucky, especially in the Bluegrass Region.

Ballard, Bath, Bourbon, Boyle, Breckinridge, Campbell, Crittenden, Cumberland, Daviess, Estill, Fayette, Franklin, Gallatin, Garrard, Green, Hancock, Harrison, Hart, Henderson, Hickman, Kenton, Leslie, Madison, Mason, Mercer, Metcalfe, Monroe, Ohio, Oldham, Owsley, Pendleton, Perry, Powell, Robertson, Scott, Shelby, Simpson, Spencer, Warren, Washington, Woodford.

Honey Locust (*Gleditschia triacanthos*).— Common everywhere. David Dale Owen says in one of his reports that thousands of these trees were destroyed by the early settlers in capturing coons, which were disposed to take refuge in them.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Christian, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Estill, Fayette, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Graves, Grayson, Green, Hancock, Hardin, Harrison, Hart, Henderson, Henry, Hickman, Hopkins, Jessamine, Johnson, Kenton, Knott, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Mason, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen.

Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Washington, Warren, Wayne, Webster, Woodford.

Water Locust (*Gleditschia aquatica*).—A small tree, the thorns small, the pods small and one-seeded. Observed by me only on the Mississippi River in Fulton County.

Red Bud (*Cercis canadensis*).—One of our most abundant and characteristic trees. Notable especially in early spring before the leaves have expanded, from the profusion of its purple blossoms. Later, the foliage becomes handsome.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Breckinridge, Butler, Caldwell, Campbell, Carroll, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Grayson, Green, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Jefferson, Jessamine, Johnson, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Mason, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Perry, Pike, Powell, Pulaski, Robertson, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Wayne, Webster, Whitley, Woodford.

Yellowwood (*Cladrastis lutea*).—One of our rarest and most attractive trees, well adapted for ornamental purposes. The white blossoms are produced in long, slender, pendent racemes. The heart wood is bright yellow, but fades when exposed to the light. I know of but one locality in the State where this tree can be called common, this is in Jessamine County in ravines along Kentucky River. On Hickman Creek near Little Hickman, I have seen some very good trees. At Brooklyn Bridge, southwest of Nicholasville, young trees are not uncommon. It has been reported to me by correspondents from several other localities, but I feel a little doubtful about the identification in some cases. Shall be pleased to receive specimens from other localities than that given above. Linney includes it in his list of Boyle and Mercer County plants. Correspondents from Estill County report this species as occurring in that section.

False Indigo (*Amorpha fruticosa*).—A shrub with abundant spikes of purple fragrant flowers. Common in cultivation. Reported by Miss Price as occurring in Warren County, Kentucky (Short and Peter).

Livingston County.

Black Locust (*Robinia pseudacacia*).—Everywhere common. The compact clusters of cream-white fragrant blossoms are a source of a good deal of bee forage.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Christian, Clark, Clinton, Crittenden, Cumberland, Daviess, Elliott, Estill, Fayette, Fleming, Floyd, Franklin Fulton, Gallatin, Garrard, Grant, Graves, Green, Hancock, Hardin, Hart, Harrison, Henderson, Henry, Hickman, Jessamine, Johnson, Kenton, Knott, Knox, Laurel, Lawrence, Larue, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Martin, Mason, McCracken, McLean, Meade, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Webster, Whitley, Woodford.

Wisteria (*Wisteria frutescens*).—A woody vine with handsome purple flowers.

Adair, Barren, Boyle, Edmonson, Hancock, Hickman, Simpson, Taylor, Union, Warren.

? Wisteria (*Wisteria macrostachys*).—Reported from Missouri and Tennessee. Should be looked for in swamps of Western Kentucky.

Rue Family (*Rutaceae*).

Prickly Ash (*Zanthoxylum americanum*).—A shrub. Rather rare, but widely distributed.

Edmonson, Nelson, Trigg.

Hop Tree (*Ptelea trifoliata*).—A shrub or small tree. Frequent, but scattered.

Edmonson, Franklin, Gallatin, Jessamine, Nelson, Oldham, Warren.

Sumach Family (*Anacardiaceae*).

Staghorn Sumach (*Rhus typhina*).—A shrub or small tree to be distinguished by the hairy or downy twigs. Local and not very common, taking the State as a whole.

Campbell, Gallatin, Greenup, Lincoln.

Smooth Sumach (*Rhus glabra*).—Shrub or small tree, the twigs smooth. Widely distributed. More common than the preceding.

Barren, Bath, Bell (frequent), Christian, Edmonson, Fayette, Franklin, Gallatin, Greenup, Logan, Mason, Rockcastle, Trigg.

Dwarf Sumach (*Rhus copallina*).—Our commonest and most widely distributed species. Often producing extensive thickets. Easily known by the flat side extensions of the axis of the leaf.

Barren, Bell, Christian, Daviess, Edmonson, Franklin, Gallatin, Green, Greenup, Hopkins, Lincoln, Logan, Todd, Rockcastle, Warren, Whitley.

? Poison Sumach (*Rhus vernix*).—Shrub with 7-13 leaflets. Swamps. Hussey credits this to Kentucky in his list of Barren and Edmonson County plants. Gattinger credits it to Tennessee.

Poison Ivy (*Rhus toxicodendron*).—A common vine everywhere in Kentucky, with but three leaflets. The Virginia creeper (with five leaflets) is sometimes mistaken for poison ivy.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Breckinridge, Bullitt, Butler, Campbell, Carroll, Casey, Clinton, Crittenden, Cumberland, Daviess, Elliott, Estill, Fleming, Franklin, Fayette, Floyd, Fulton, Gallatin, Garrard, Grant, Graves, Green, Greenup, Hancock, Hardin, Harrison, Hart, Hickman, Jessamine, Johnson, Kenton, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Martin, Mason, M-

Cracken, McLean, Meade, Menifee, Mercer, Metcalfe, Monroe, Morgan, Nicholas, Ohio, Oldham, Owen, Owsley, Perry, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Wolfe, Woodford.

Fragrant Sumach (*Rhus canadensis*).—A common shrub growing along rocky banks and bluffs. Its red berries will enable any one to distinguish it from poison ivy and poison sumach. It has three leaflets.

Fayette, Franklin, Jessamine, Mercer, Warren.

Holly Family (*Aquifoliaceae*).

Holly (*Ilex opaca*).—A beautiful tree with spiny evergreen leaves and red berries. Often gathered for Christmas decorations. Common in the mountains of Eastern Kentucky. Extending westward to Edmonson and Grayson counties, but becoming local and rare in this western territory. The largest tree I have ever seen was observed June 15, 1895, in Wolfe County; it was fully forty feet high and eight inches thru at the base; the bark smooth, opaque gray with whitish splashes.

Adair, Allen, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Butler, Carter, Clinton, Cumberland, Daviess, Edmonson, Elliott, Estill, Fleming, Floyd, Garrard, Grayson, Hart, Johnson, Knott, Larue, Laurel, Leslie, Letcher, Lewis, Logan, Madison, Metcalfe, Monroe, Montgomery, Morgan, Ohio, Owsley, Perry, Pike, Powell, Pulaski, Rockcastle, Rowan, Russell, Simpson, Wayne, Whitley, Wolfe

Swamp or Meadow Holly (*Ilex decidua*).—
Hickman, Madison, McCracken; Warren (Miss Price)

Ilex monticola var. mollis.—
Kentucky (Hussey).

Winter Berry (*Ilex verticillata*).—
Edmonson, Rockcastle, Warren.

FIG. 18.—BLOSSOMS AND LEAVES OF HOLLY (*Ilex opaca*). NATURAL SIZE.

Staff Tree Family (*Celastraceae*).

Waahoo (*Evonymus atropurpureus*).—A shrub or slender tree, with green twigs and conspicuous lobed crimson fruit, noticeable in the fall after the leaves are gone. Common in Bluegrass Kentucky along fences.

Campbell, Edmonson, Fayette, Franklin, Gallatin, Hickman, Jessamine, Johnson, Leslie, Logan, Madison, Mason, Oldham, Rowan, Warren.

Strawberry Bush (*Evonymus americanus*).—Not rare in mountain counties. Fruit similar to that of the preceding but hulls rough. Growth inclined to be less upright.

Bell, Carroll, Fleming, Gallatin, Leslie, Lyon, Russell, Spencer, Rockcastle.

FIG. 19.—LEAVES AND BLOSSOMS OF WAAHOO (*Evonymus atropurpureus*). REDUCED.

Evonymus obovatus.—Kentucky (Gray's Manual).

Bittersweet (*Celastrus scandens*).—An attractive vine common everywhere in tangles of vegetation, over which it clambers. Noticeable in the fall from its bright orange fruit.

Adair, Allen, Bath, Bourbon, Boyd, Campbell, Carroll, Cumberland, Elliott, Estill, Fayette, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Hardin, Harrison, Jefferson, Jessamine, Knott, Larue, Laurel, Leslie, Letcher, Lincoln, Monroe, Morgan, Nicholas, Oldham, Owsley, Perry, Powell, Robertson, Rowan, Scott, Shelby, Taylor, Warren, Webster.

Bladder Nut Family (*Staphyleaceae*).

American Bladder Nut (*Staphylea trifolia*).—A shrub or small tree, with an inflated pod an inch long. Leaflets, 3 commonly.

Edmonson, Fayette, Gallatin, Mason, Woodford.

Maple Family (*Aceraceae*).

? Striped Maple (*Acer pennsylvanicum*).—

? Mountain Maple (*Acer spicatum*).—

Sugar Maple (*Acer saccharum*).—A common tree and a great favorite because of its beauty and pleasant associations with the childhood of most Kentuckians.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Carlisle, Carroll, Casey, Clark, Christian, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Grayson, Green, Greenup, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Hopkins, Jefferson, Jessamine, Johnson, Kenton, Knott, Knox, Larue, Laurel, Lawrence, Letcher, Lewis, Livingston, Logan, Lyon, Madison, Marion, Martin, Mason, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Woodford.

Black Maple (*Acer nigrum*).—A fine tree, sometimes seen in woodland pastures. The leaves are green on both sides, the paler beneath. Those of the common species are decidedly paler beneath. Not commonly regarded as distinct from the preceding, and considered a variety by some botanists. Those I have seen are at once recognizable by the large stipules of the leaves.

Fayette and adjoining counties. Boyle and Mercer (Linney) Warren (Miss Price).

Soft or White Maple, Water Maple (*Acer saccharinum*).—A common tree along streams and often used for shade, for which purpose it is generally chosen because of its rapid growth. Its soft wood renders it subject to frequent injury by summer storms and winter sleet.

Adair, Allen, Ballard Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Graves, Green, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Jessamine, Johnson, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lincoln, Livingston, Logan, Lyon, Madison, Mason, McCracken, McLean, Menifee, Mercer, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Rockcastle, Rowan, Russell, Scott, Simpson, Spencer, Todd, Trigg, Union, Warren, Washington, Wayne, Webster, Whitley, Wolfe, Woodford.

Red Maple (*Acer rubrum*).—An attractive tree of medium or small size, widely distributed in the State, and common locally.

Ballard, Barren, Bath, Bell, Boyd, Breathitt, Carroll, Casey, Clinton, Crittenden, Cumberland, Daviess, Fayette, Fleming, Floyd, Fulton, Gallatin, Garrard, Graves, Grayson, Hancock, Hardin, Hart, Hickman, Hopkins, Lawrence, Leslie, Letcher, Lincoln, Livingston, Lyon, Madison, McLean, Monroe, Morgan, Muhlenberg, Nelson (abundant), Ohio, Oldham, Perry, Rowan, Shelby, Spencer, Todd.

Box Elder (*Acer negundo*).—Common along streams.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Bracken, Butler, Caldwell, Campbell, Carroll, Casey, Christian, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Graves, Green, Jessamine, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Laurel, Lawrence, Leslie, Lincoln, Livingston, Logan, Lyon, Madison, Mason, McCracken, McLean, Mercer, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Union, Warren, Washington, Wayne, Webster, Woodford.

Soapberry Family (*Sapindaceae*).

Ohio Buckeye (*Aesculus glabra*).—A common tree, with fine foliage, and splendid big mahogany-colored seeds, well known to every schoolboy. Hulls prickly. Admirably adapted for park and lawn.

Ballard, Barren, Boyle, Butler, Breathitt, Caldwell, Campbell, Carroll, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Floyd, Franklin, Gallatin, Garrard, Grant, Greenup, Hart, Henderson, Larue, Lawrence, Leslie, Lewis, Logan, Mason, McLean, Mercer, Metcalfe, Monroe, Nelson, Owsley, Perry, Powell, Rockcastle, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Trigg, Woodford.

Sweet Buckeye (*Aesculus octandra*).—An attractive tree, to be distinguished from the preceding by the smooth hulls of the seeds. Not so generally scattered in the State, but the common species in the mountains.

Bell, Breckinridge, Bullitt, Crittenden, Cumberland, Daviess, Gallatin, Garrard, Green, Hancock, Hart, Johnson, Kenton, Knott, Larue, Letcher, Lincoln, Madison, Martin, Mason (common), Monroe, Morgan, Oldham, Owsley, Pike, Powell, Pulaski, Robertson, Scott, Simpson, Spencer, Taylor.

Red Buckeye (*Aesculus pavia*).—Seen by me only in Western Kentucky—about Columbus. A handsome, compact shrub, with red blossoms. I have had it reported from other localities, but do not feel satisfied that it grows spontaneously away from the Mississippi River. Correspondents will confer a favor by sending me specimens from other localities than that mentioned.

Floyd, Monroe, Scott.

Buckthorn Family (*Rhamnaceae*).

Supple Jack (*Berchemia scandens*).—
Hickman, Fulton County, 1892.

Narrow-leaved Buckthorn (*Rhamnus lanceolata*).—Shrub; not common.

Franklin, Woodford.

Common Buckthorn (*Rhamnus caroliniana*).—Shrub with black berries. Common locally.

Bell, Edmonson, Logan, Meade, Nelson, Todd, Warren, Woodford.

New Jersey Tea (*Ceanothus americanus*).—A small shrub of frequent occurrence in mountain counties and westward.

Bell, Lincoln, Warren.

Vine Family (*Vitaceae*).

Virginia Creeper (*Psedera quinquefolia*).—One of our most attractive American vines. A vigorous, hardy plant. Common everywhere.

Bell, Christian, Edmonson, Fayette, Franklin, Fulton, Harlan, Hardin, Lincoln, Nelson, Powell, Rockcastle, Warren, Whitley.

Cissus ampelopsis.—A vine. Not common.

Bell, Franklin, Harlan, Larue, Warren.

Pepper Vine (*Cissus arborea*).—

Lexington (Collected by Miss Mary Didlake of the Division).

Northern Fox Grape (*Vitis labrusca*).—

Bell County.

? Summer Grape (*Vitis aestivalis*).—

Warren (Miss Price).

Frost Grape (*Vitis cordifolia*).—Our commonest species.

Lexington, Frankfort, Olympia and Pineville. Logan and Whitley counties.

River-bank Grape (*Vitis vulpina*).—

Aden Springs.

Red Grape (*Vitis palmata*).—

Hickman.

Muscadine Grape (*Vitis rotundifolia*).—Common in southern counties along streams.

Glasgow Junction, Cumberland Falls, Corbin. Fulton County, Whitley County (common).

Linden Family (*Tiliaceae*).

Basswood, Linn (*Tilia americana*).—An attractive tree. The blossoms furnish good bee forage.

Boyd, Boyle, Breckinridge, Cumberland, Daviess, Gallatin, Hart, Hickman, Larue, Laurel, Letcher, Oldham, Pendleton, Perry, Rockcastle, Rowan.

Downy-leaved Basswood (*Tilia michauxii*).—
Breathitt, Powell, Woodford.

White Basswood (*Tilia heterophylla*).—A beautiful tree. Common along streams.

Boyle, Fayette, Gallatin, Hart, Hickman, Jessamine, Letcher, Lincoln, Madison, Perry, Rockcastle, Rowan, Spencer, Warren, Wolfe.

Camellia Family (*Ternstroemiaceae*).

Stewartia pentagyna.—A beautiful shrub, sometimes reaching a height of nine feet, the flowers three inches across. Pineville—common locally. The second species of the genus (*S. malachodendron*), has been credited to Kentucky, but I am disposed to question the accuracy of the reference.

Bell, Letcher, Powell, Rowan.

St. John's-wort Family (*Hypericaceae*).

Shrubby St. John's-wort (*Hypericum prolificum*).—
Rockcastle, Wayne.

St. Andrew's Cross (*Ascyrum hypericoides*).—
Madison, Ohio, Fulton.

Leatherwood Family (*Thymeleaceae*).

Leatherwood (*Dirca palustris*).—A rather common shrub in the mountains. Local elsewhere.

Adair, Allen, Bath, Boyd, Casey, Clinton, Cumberland, Edmonson (frequent in shaded places along Nolin River, 4 feet in height),Elliott, Estill, Floyd, Grant, Green, Hardin, Hart, Jessamine, Johnson, Knott, Larue, Lawrence, Leslie, Lewis, Martin, Metcalfe, Monroe, Morgan, Owsley, Perry, Pike, Powell, Pulaski, Rowan, Russell, Spencer, Wayne, Whitley.

Ginseng Family (*Araliaceae*).

Hercules' Club (*Aralia spinosa*).—A shrub or small tree with prickly stem and showy spreading panicle of flowers and fruit.

Bell, Christian, Crittenden, Edmonson, Jefferson, Lincoln, Todd, Warren, Wayne.

Bristly Sarsaparilla (*Aralia hispida*).—
Kentucky (Miss Price).

Dogwood Family (*Cornaceae*).

Flowering Dogwood (*Cornus florida*).—A small tree, common in most woodland. The large white involucres of the blossoms expand in spring before the leaves of the forest trees and render the dogwood conspicuous for a time.

Adair, Allen, Ballard Barren, Bath, Bell, Bourbon, Boyd, Boyle, Breckinridge, Bullittt, Butler, Campbell, Carroll, Casey, Christian, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Estill, Fayette, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Graves, Grayson, Green, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Hopkins, Jefferson, Jessamine, Johnson, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, McCracken, McLean, Menifee, Mercer, Metcalfe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Wayne, Webster, Whitley, Woodford.

Round-leaved Dogwood (*Cornus circinata*).—Linney.

Silky Cornel (*Cornus stolonifera*).—Short and Peter; Miss Price.

Campbell, Crittenden, Franklin, Gallatin, Garrard, Hancock, Laurel, Madison, Perry, Powell, Rockcastle, Spencer.

Stiff Cornel (*Cornus stricta*).—
Rockcastle County.

Cornus paniculata.—
Kentucky (Short and Peter).

Cornus alternifolia.—
Kentucky (Short and Peter); Linney; Rockcastle (Williamson).

Black Gum (*Nyssa sylvatica*).—A common and attractive tree with the outer bark checked both lengthwise and crosswise, producing squarish areas. Foliage often purple in autumn.

Adair, Allen, Ballard, Barren, Bath, Bell, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Casey, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fleming, Floyd, Fulton, Gallatin, Garrard, Grant, Graves, Grayson, Green, Hancock, Hardin, Hart, Henderson, Hickman, Jessamine, Johnson, Knott, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Martin, McCracken, McLean, Metcalfe, Monroe, Montgomery, Morgan, Muhlenberg, Nelson, Nicholas, Ohio, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Simpson, Spencer, Taylor, Todd, Trigg, Union, Wayne, Webster, Whitley, Wolfe.

Swamp Black Gum (*Nyssa aquatica*).—Not as common or well known as the preceding.

Todd, Warren.

Heath Family (*Ericaceae*).

Sweet Pepper Bush (*Clethra alnifolia*).—
Western Kentucky (DeFriese).

FIG. 20.—MOUNTAIN LAUREL (*Kalmia latifolia*). LOWER FIGURES, NATURAL SIZE. Photographed by H. GARMAN.

White Alder (*Clethra acuminata*).—
Cumberland Mountains (Kearney); Wolfe.

Spotted or Bitter Wintergreen (*Chimaphila maculata*).

Smooth Azalea (*Rhododendron viscosum*).—
Kentucky (DeFriese); Rockcastle (Williamson).

Pinxter Flower (*Rhododendron nudiflorum*).—
Rockcastle.

Pinxter Flower (*Rhododendron canescens*).—Greenup County.

Flame-colored Azalea (*Rhododendron calendulaceum*).—
Adair, Bath, Breathitt, Knott, Leslie, Morgan, Perry, Powell, and other mountain counties. Common. In bloom in early spring.

Great Laurel (*Rhododendron maximum*).—A fine shrub or small tree with glossy leaves and clusters of rose-colored flowers. Common in shaded ravines in the mountains.

Bath, Bell, Estill, Floyd, Johnson, Knott, Laurel, Menifee, Perry, Powell, Pulaski, Rockcastle, Taylor, Whitley, Wolfe.

Mountain Laurel (*Kalmia latifolia*).—A common and beautiful shrub in the mountains, but extending westward into Edmonson, Grayson and western Hardin counties. M'Murtrie credits also *K. angustifolia* to Kentucky, but no recent collector has observed it here.

Adair, Bath, Bell, Boyd, Cumberland, Edmonson, Elliott, Estill, Fleming, Floyd, Harlan, Hart, Knott, Knox, Larue, Laurel, Lawrence, Leslie, Letcher, Lewis, Menifee, Monroe, Montgomery, Morgan, Owsley, Perry, Pike, Powell, Pulaski, Rockcastle, Rowan, Taylor, Trigg, Wolfe.

Male Berry (*Lyonia ligustrina*).—
Cumberland Mountains (Kearney); Rockcastle County.

Sorrel Tree, Sourwood (*Oxydendrum arboreum*).—A common tree in the mountains of Kentucky, but occurring in small numbers elsewhere in the State.

Bell, Boyd, Campbell, Edmonson, Estill, Letcher, Lincoln, Madison, Ohio, Perry, Rockcastle, Whitley.

Trailing Arbutus (*Epigaea repens*).—Common in the mountains.

Carter, Garrard, Hart, Knott, Knox, Letcher, Perry, Powell, Rockcastle.

Wintergreen, Teaberry (*Gaultheria procumbens*).—A common plant in some of the mountain counties.

Jackson, Knox, Powell, Rockcastle.

Gaylussacia brachycera.—Kentucky (Linney).

Dwarf Huckleberry (*Gaylussacia dumosa*).—
Warren County (Miss Price).

Blue Tangleberry (*Gaylussacia frondosa*).—
Kentucky (Short and Peter); Linney; Warren County (Miss Price).

Bear Huckleberry (*Gaylussacia ursina*).—
Kentucky (Gray's Manual); Cumberland Mountains (Kearney).

Black Huckleberry (*Gaylussacia baccata*).—
Kentucky (M'Murtrie's list); Kentucky (Short and Peter).

Farkleberry (*Vaccineum arboreum*).—
Edmonson, Lincoln, Livingston, Logan, Warren, Whitley.

Deerberry (*Vaccineum stamineum*).—
Breathitt (common), Lincoln, Rockcastle, Oldham.

Late Low Blueberry (*Vaccineum vacillans*).—
Powell County.

High Blueberry (*Vaccineum corymbosum*).—
Bell, Powell.

Sapodilla Family (*Sapotaceae*).

Southern Buckthorn (*Bumelia lycioidea*).—
Edmonson County, near Dickey's Mills. Warren County (Miss Price).

Ebony Family (*Ebenaceae*).

Persimmon (*Diospyrus virginiana*).—One of our commonest and most generally distributed trees.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Clark, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Graves, Green, Greenup, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Hopkins, Johnson, Knott, Knox, Larue, Laurel, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Martin, Mason, McCracken, McLean, Meade, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Trimble, Union, Warren, Washington, Webster, Whitley, Wolfe, Woodford.

Storax Family (*Styracaceae*).

Opossum Wood (*Halesia carolina*).—
Star Lime Works, Lyon County.

Storax americana.—
Kentucky (Linney).

Olive Family (*Oleaceae*).

White Ash (*Fraxinus americana*).—A splendid tree, formerly not uncommon locally thruout the State. Merchantable trees now largely gone.

Adair, Allen, Ballard, Barren, Bath, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Campbell, Carroll, Casey, Christian, Clark, Clinton, Crittenden, Cumberland, Daviess, Elliott, Estill, Fayette, Fleming, Floyd, Fulton, Gallatin, Garrard, Grant, Green, Hancock, Harrison, Hart, Henderson, Hickman, Jessamine, Johnson, Knott, Knox, Larue, Laurel, Leslie, Letcher, Lewis, Livingston, Logan, Lyon, Marion, Martin, McCracken, McLean, Menifee, Mercer, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Union, Washington, Wayne, Warren, Webster, Whitley, Woodford.

Biltmore Ash (*Fraxinus biltmoreana*).—I am including this on the basis of a small lot of seeds collected by me near Nicholasville, in Jessamine County, September 28, 1899. They are larger than those of the red ash, the seed plumper and better defined where it joins the wing. The tree resembles the white ash, but has pubescent twigs.

Red Ash (*Fraxinus pennsylvanica*).—

Adair, Ballard, Bath, Boyd, Campbell, Carroll, Clinton, Edmonson, Elliott, Estill, Fayette, Franklin, Fleming, Fulton, Gallatin, Garrard, Grayson, Green, Hart, Henderson, Laurel, Leslie Livingston, Lyon, Martin, McLean, Menifee, Monroe, Muhlenberg, Owsley, Perry, Powel, Pulaski, Rockcastle (very common), Rowan Scott, Simpson, Spencer, Warren, Whitley.

Green Ash (*Fraxinus lanceolata*).—Not as common as the white and red ashes.

Bourbon, Carroll, Fayette, Fleming, Fulton, Gallatin, Garrard, Hardin, Larue, Madison.

Blue Ash (*Fraxinus quadrangulata*).—A common tree locally

Allen, Ballard, Barren, Bath, Bourbon, Boyd, Breckinridge, Bullitt, Campbell, Carroll, Clark, Clinton, Cumberland, Daviess, Elliott, Estill, Fayette, Fleming, Fulton, Franklin, Gallatin, Grant, Harrison, Hart, Henderson, Hickman, Jessamine, Kenton, Leslie, Livingston, Madison, Mason, McLean, Menifee, Mercer, Monroe, Morgan, Nicholas, Owen, Pendleton, Perry, Powell, Pulaski, Robertson, Russell Scott, Shelby, Spencer, Trimble, Union, Warren, Wayne, Webster, Whitley, Woodford.

Black Ash (*Fraxinus nigra*).—Swamps.
Kentucky (DeFriese).

Fringe Tree (*Chionanthus virginica*).—An attractive shrub, with sweet-scented blossoms. Local and not common, taking the State as a whole.

Adair, Bath, Cumberland, Estill, Madison, Marion, Menifee, Morgan, Powell, Pulaski, Rowan, Rockcastle. Green River, July, 1895.

Bignonia Family (*Bignoniaceae*).

Trumpet Creeper (*Tecoma radicans*).—An ornamental vine with fine trumpet-shaped orange-red flowers and graceful foliage. Sometimes complained of as a weed, but easily exterminated.

Adair, Ballard, Barren, Bell, Bourbon, Carroll, Cumberland, Daviess, Edmonson, Fayette, Franklin, Fulton, Gallatin, Greenup, Hancock, Hickman, Jessamine, Knott, Letcher, Livingston, Logan, Mason, McCracken, Menifee, Morgan, Mulhenberg, Ohio, Owen, Perry, Rockcastle, Scott, Simpson, Taylor, Todd, Warren, Woodford.

Catalpa (*Catalpa speciosa*).—A well known tree growing on bottom land. Of importance both because of its beauty for the lawn and for the durability of its wood. To be distinguished from the related southern *C. bignonioides* by its upright growth and deeply longitudinally grooved bark.

Boone, Muhlenberg, Trigg.

Catalpa (*Catalpa bignonioides*).—Common in cultivation.
Gallatin (J. F. Donaldson).

Cross Vine (*Bignonia capreolata*).—A common ornamental vine.

Allen, Ballard, Butler, Caldwell, Clinton, Crittenden, Edmonson, Fayette, Fulton, Gallatin, Hart, Hickman, Jessamine, Knott, Knox, Letcher, Lyon, Ohio, Owsley, Perry, Powell, Pulaski, Rockcastle, Russell, Spencer, Trigg, Wayne, Whitley, Wolfe.

Madder Family (*Rubiaceae*).

Partridge Berry (*Mitchella repens*).—A small trailing vine common in the mountains. A pleasing ornamental plant.

Bell, Carter, Powell, Rockcastle, Wolfe (common).

Buttonbush (*Cephalanthus occidentalis*).—An attractive shrub, partial to wet ground along ditches and streams.

Bell, Daviess, Edmonson, Fayette, Franklin, Gallatin, Graves, Hickman, Hopkins, Livingston, Nelson, Oldham, Simpson, Warren.

Honeysuckle Family (*Caprifoliaceae*).

Trumpet Honeysuckle (*Lonicera sempervirens*).—
Bullitt.

? Lonicera sullivantii.

Lonicera dioica.—
Kentucky (Linney).

Yellow Honeysuckle (*Lonicera flava*).—
Warren County (Miss Price). Kentucky (Linney).

Buckberry, Coralberry (*Symphoricarpos orbiculatus*).—A very common shrub along roadsides and in thickets.

Christian, Edmonson, Fayette, Franklin, Grayson, Hart, Jessamine, Logan, McCracken, Nelson, Todd, Woodford.

Dockmackie (*Viburnum acerifolium*).—A common shrub in mountain counties of Eastern Kentucky.

Bell, Breathitt, Edmonson, Rockcastle.

? Downy Arrowwood (*Viburnum pubescens*).—
Kentucky (Short and Peter).

Viburnum molle.—
Kentucky (Gray's Manual).

Arrowwood (*Viburnum dentatum*).—Fayette, Rockcastle.

Withe Rod (*Viburnum cassinoides*).—Fayette, Rockcastle.

Viburnum nudum.—Kentucky (Hussey).

Sheepberry (*Viburnum lentago*).—Bath, Bell, Fayette.

Black Haw (*Viburnum prunifolium*).—Frequent thruout the State.

Adair, Allen, Ballard, Barren, Bath, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Clark, Clinton, Crittenden, Cumberland, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Fulton, Gallatin, Garrard, Grayson, Grant, Green, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Jessamine, Johnson, Kenton, Knott, Larue, Laurel, Lawrence, Leslie, Letcher, Logan, Lyon, Madison, Mason, McCracken, McLean, Menifee, Mercer, Metcalfe, Monroe, Montgomery, Morgan, Nelson, Nicholas, Powell, Pulaski, Robertson, Rockcastle, Russell, Scott, Shelby, Simpson, Spencer, Taylor, Trigg, Trimble, Wayne, Webster, Whitley, Woodford.

Viburnum rufidulum.—Bullitt, Powell, Warren, Woodford.

Common Elder (*Sambucus canadensis*).—A common shrub everywhere, with showy cymes of white flowers, producing large numbers of small black berries.

Adair, Allen, Ballard, Barren, Bath, Bell, Bourbon, Boyd, Boyle, Breckinridge, Bullitt, Butler, Caldwell, Campbell, Carroll, Casey, Clark, Clinton, Crittenden, Cumberland, Daviess, Edmonson, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Fulton, Gallatin, Garrard, Grant, Graves, Green, Hancock, Hardin, Harrison, Hart, Henderson, Hickman, Jessamine, Johnson, Kenton, Knott, Knox, Laurel, Lawrence, Leslie, Letcher, Lewis, Lincoln, Livingston, Logan, Lyon, Madison, Marion, Mason, McCracken, McLean, Menifee, Monroe, Montgomery, Morgan, Nelson, Nicholas, Ohio, Oldham, Owen, Owsley, Perry, Powell, Pulaski, Robertson,

Russell, Scott, Shelby, Simpson, Spencer, Taylor, Todd, Trigg. Trimble, Union, Warren, Washington, Wayne, Webster, Whitley, Woodford.

Red Elder (*Sambucus racemosa*).—I am familiar with this plant as it grows in Northern Michigan, but have not seen it in Kentucky. It has been reported to me from the following counties:

Allen, Boyd, Campbell, Carroll, Fleming, Hart, Knox, Marion, Menifee, Powell, Rowan, Simpson. Kentucky (Linney).

It is not recorded in either M'Murtrie's or Short and Peter's list. Gattinger appears not to have observed it in Tennessee.

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